AN INTERNATIONAL DATA GROUP PUBLICATION, VOLUME 10, NUMBER 27, JULY 5, 1993

NETWORK WORLD

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

APPWARE

Novell grabs tail of development beast

BY CARYN GILLOOLY

New York

Novell, Inc. last week rolled out a broad-reaching development environment that the company claims will spark an "explosion of network applications" by making it easier for users and vendors to build software that runs on diverse desktops and networks.

As expected, the AppWare environment leverages technologies Novell acquired through deals with companies such as Serius Corp. and Software Transformation, Inc. (STI) to mask the complexity of building applications that work with multiple operating systems, graphical user interfaces and networks.

"Applications that harness the power of the network are the key to transforming computing power into competing power," said John Edwards, executive vice president of Novell's Desktop Systems Group in Provo, Utah. "AppWare will let you focus on the applications and leave the details to us."

Observers praised the ambitious goals the company is setting out to achieve with AppWare, which even Novell acknowledged may seem "too good to be true." But they questioned how quickly Novell can pull together the third-party

See Novell, *page 51*

DANILLE SWICK

John Edwards of Novell

Wireless, enterprise tools top Apple network agenda

Mac application developers to get new networking freedom.

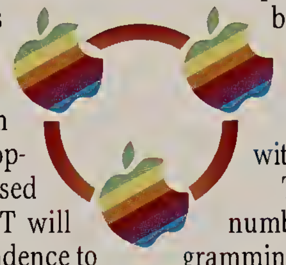
BY FREDRIC PAUL

San Jose, Calif.

With an eye toward fortifying its position in enterprise networks, Apple Computer, Inc. will bolster AppleTalk during the next 12 months with wider connectivity options, improved remote access features and support for wireless technology.

Final version of Apple Open Collaboration Environment demonstrated for first time, page 6.

Apple revealed its plans to users and vendors gathered at the Mactivity '93 conference here. Although it did not announce specific products, the company said it is committed to filling customer needs in these areas. "You can hold us accountable if we haven't delivered" by this time next year, said Garry Hornbuckle, Apple's networking evangelist.



The key to Apple's connectivity efforts will be The Enterprise Toolbox (TET), which includes a set of development tools and a revised AppleTalk protocol. TET will deliver protocol independence to Macintosh application developers and, ultimately, users by supporting an open programming interface. Developers will be able to write Macintosh applications once and have them work with different network protocols with little or no recoding, Hornbuckle said.

TET's success will depend on support from the independent software vendor community. But if TET attracts developers as Apple hopes, it will provide major benefits to users by bringing additional network applications to market faster and with fewer bugs.

TET incorporates a number of existing programming facilities — the X/Open Transport Interface, Unix Streams and the Data Link Programming Interface — making it easier for programmers to tweak applications that already support those facilities to run on the Macintosh.

See AppleTalk, *page 51*

Chemical Bank invests in client/server futures

BY JIM DUFFY

New York

Chemical Bank last week awarded NCR Corp. a $32 million contract to replace terminals in 385 branch offices with Unix-based client/server networks designed to make it easier to deliver new customer services.

The upgrade plan will give the nation's third largest commercial bank a common branch office application development, processing and delivery environment that is expected to cut development time by 80%.

The contract was prompted by Chemical's recent acquisition of Manufacturers Hanover Corp., through which Chemical inherited several older, proprietary terminal-to-host branch office systems comprising equipment from Digital Equipment Corp., Motorola, Inc., NCR and other vendors. Branch office terminals are linked to a central facility that supports all of Chemical's application processing.

The proprietary systems made it difficult to develop, roll out and support new financial products and features, which, in turn, made it difficult to service customers, Chemical officials said.

Using Unix-based servers to anchor the new branch systems will enable the bank to standardize on a consistent pro-

See Chemical Bank, *page 52*

NEWSPAPER

100

AS/400 to get major net upgrade

BY MICHAEL COONEY

Rochester, Minn.

IBM last week detailed its two-year plan to make the AS/400 a communications box for all seasons.

At an Application System/400 press and consultant conference here, IBM explained how it plans to bring the popular mid-range system into the world of high-speed nets with support for technologies such as Asynchronous Transfer Mode and frame relay. The AS/400 is also slated to be outfitted with IBM's Multiprotocol Transport Networking (MPTN) technology, which will enable its applications to work with a variety of underlying transport protocols.

In addition, IBM said it would make the AS/400 a better local-area network server by offering versions preconfigured for specific LAN environments and improving support for Apple Computer, Inc., Novell, Inc. and other types of client platforms.

"IBM is trying to position the AS/400 to communicate with everything," said Robert Tipton, president of R.S. Tipton, Inc., a systems integration and consulting firm in Littleton, Colo. "IBM has the

See AS/400, *page 52*

MESSAGING

Revamp E-mail pricing, users say

BY BOB BROWN

Users are pressuring providers of electronic messaging services to bring pricing in line with new application needs.

Traditional per-character pricing has worked well enough for sending simple text messages, but it is prohibitive for users sending large messages or multimedia documents with attachments such as graphics and images. It is also proving to be a problem as the volume of message traffic increases.

Many users are looking beyond character-based pricing — typically per kilocharacter — to other options such as flat-rate fees that would cover access and unlimited messaging. "Carriers [need] to reevaluate pricing, particularly as we get into compound documents," said Steve Mahaney, a vice president at Chase Manhattan Bank, N.A. in New York.

MARK ESCHER

CUNNINGHAM

According to Mahaney, Chase has worked with carriers on an application-by-application basis to establish new pricing arrangements, but he declined to discuss them in detail.

Durwin Sharp, electronic mail advisor at Exxon Computer Services Co. in Houston, said he "has tried everything short of a carrier pigeon" to keep costs down when sending long messages.

"Pricing is an obstacle," Sharp said. "Even 5 cents a kilocharacter just eats your lunch for sending any reasonable size file. Multimedia would blow the lid off."

Vendors acknowledge that a new class of messaging applications is forcing them to reevaluate pricing. While some contend their pricing is already flexible

See Pricing, *page 12*

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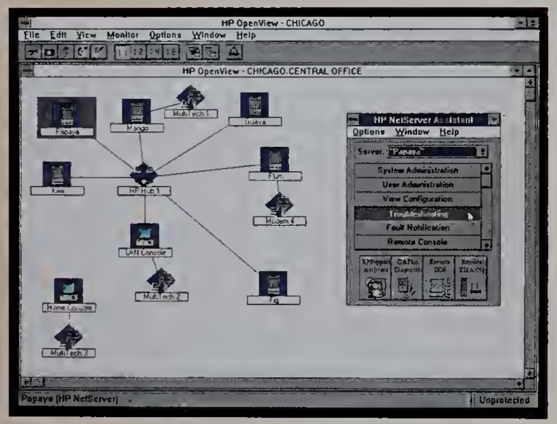
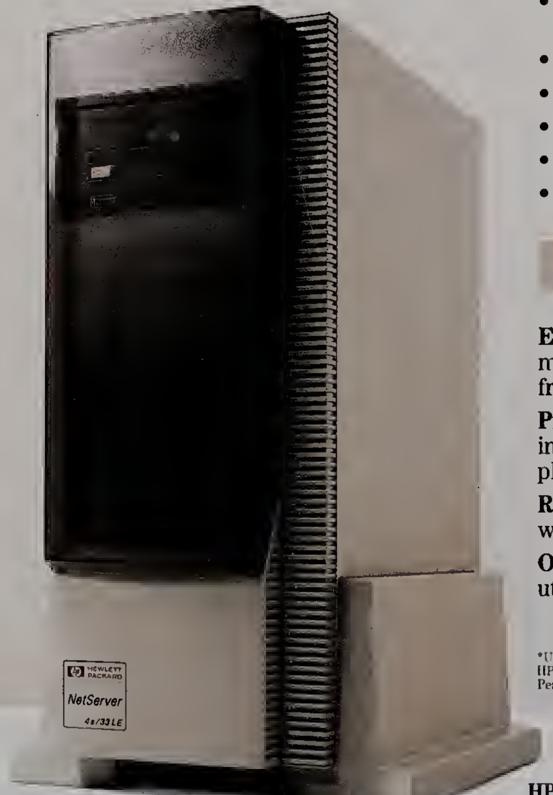


HP NetServer Assistant



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- 60-MHz Intel Pentium™ processor, 33-MHz Intel 486 DX and 66-MHz Intel 486 DX2 processors
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HP NetServer LE

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- 4-MB and 8-MB standard RAM, 128-MB maximum memory
- 256-KB external cache
- 4 mass storage shelves, 3.5″ floppy disk drive standard, maximum 3-GB internal storage
- 5 EISA bus-master I/O slots
- Integrated Fast SCSI-2, IDE and video controllers
- HP NetServer Assistant software available as an option
- 3-year on-site, next-business-day limited warranty
- Tested and certified on major network operating systems

HP NetServer Assistant

Easy-to-use centralized management based on HP OpenView's leading network management environment allowing multiple servers in multiple sites to be managed from a single graphical map.

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Remote management capabilities allow administrators to use the same tools whether at their local console or a remote PC.

Open architecture facilitates adding specialized third-party or HP management utilities.

intel inside

yes NetWare Tested and Approved

*U.S. list price for HP NetServer LM Model 530, including 486/33DX processor, 16-MB RAM and 535-MB SCSI hard drive. **U.S. list price for HP NetServer LE Model 240, including 486/33SX processor, 4-MB RAM and 240-MB IDE hard drive. Prices subject to change without notice. Pentium and the Intel Inside logo are U.S. trademarks of Intel Corporation. ©1993 Hewlett-Packard Company PPG686

HEWLETT PACKARD

If managing your server eats up all your time, you need an assistant.

Briefs

Sybase to air tool strategy. Sybase, Inc. next week will announce Gain Momentum 2.0, a new version of the company's object-oriented, multimedia development software for building applications that can access Sybase and other databases (*NW*, May 24, page 29). Sybase will also lay out its future development tool strategy.

Access to multiple E-mail services on tap. Computer Mail Services, Inc. of Southfield, Mich., next week will announce MailPlus ($99.95), a Microsoft Corp. Windows package providing a single view of multiple public mail services. It will initially support MCI Communications Corp.'s MCI Mail, with support for other nets, including CompuServe, Inc.'s CompuServe, added over time.

Hammering out a plan. The Frame Relay Forum's technical committee put the finishing touches on a specification that — among others things — lays out a standard means of encapsulating IBM Systems Network Architecture data in frame relay frames. Today, router vendors use different methods for shipping SNA over frame relay.

Delivering on a promise. Hewlett-Packard Co., IBM, SunSoft, Inc. and Unix System Laboratories, Inc. — the founding members of the Common Open Software Environment (COSE) group (*NW*, March 22, page 1) — last week released the COSE Desktop specification to X/Open Company, Ltd. for review. The specification is designed to help developers build applications across multiple Unix versions.

Catching the HP train. Synernetics, Inc. said its Viewplex management system will work with Hewlett-Packard Co.'s OpenView management platform. Viewplex, which controls Synernetics' LANplex 5000 switching hubs, currently runs atop SunConnect's SunNet Manager. Available in October, the OpenView version will cost $11,900.

New partners. Tivoli Systems, Inc. has recruited nine more vendors, including Hewlett-Packard Co. and Remedy Corp., to port applications to its Management Environment, a management platform for Unix networks. HP's PerfView peformance management and Remedy's Action Request trouble ticketing applications will be available on the platform in the fourth quarter.

You win some, you lose some. AT&T said three Tariff 12 customers — Northwest Airlines, Honeywell, Inc. and Cargill, Inc. — have extended their custom net deals during the Federal Communications Commission-mandated Fresh Look period. Combined, the deals are valued at roughly $250 million.

In a related note, MCI said Boise Cascade Corp. dropped a Tariff 12 and signed a five-year, $30 million contract for MCI 800, Virtual Network and data services.

More protection. AT&T will announce this week the AT&T Card Protect service, which shields users from losses from fraudulent calls placed with lost or stolen AT&T corporate calling cards. Users of AT&T corporate calling cards will not be charged for the service.

You can print this. At PC Expo, Digital Equipment Corp. brought out software that lets Novell, Inc. NetWare and Microsoft Corp. Windows NT users print to any DEC printer on a network. PrintServer features automatic conversion from ASCII to PostScript format and is priced from $4,695 to $20,995. The NetWare version is available this month, while orders for the NT version will be taken in October.

Contacts

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Network HELP *desk*

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at scollins@world.std.com.

I need to connect five school networks to our central net. All are running Novell, Inc. NetWare 3.11 over token rings. I'm looking for a solution that will allow me to implement remote network administration, electronic mail, file transfer and IBM 5250 emulation. I have been told that Novell's WAN Links software, synchronous adapters and 56K bit/sec digital lines will work. Is this a viable option for me?

Bill Cleveland, Goochland, Va.

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day per week independent NetWare technical support company in Lake Oswego, Ore., replies:

Yes, Novell WAN Links 2.0, synchronous adapter and 56K bit/sec lines will enable you to implement remote administration, E-mail, file transfer and 5250 emulation. I would suggest using the Synchronous V.35 adapters since the regular Synchronous adapters don't work well beyond 19.2K bit/sec.

Also, look into the pricing for T-1 digital lines. Depending on the area you are in, this may not be that much more expensive than the 56K bit/sec lines you are looking at and would give you better bandwidth between networks.

When a tariff is in conflict with a regulation, which one prevails? While everyone agrees that regulations have precedence over tariffs, no one has been able to cite an authority for this. Can you?

Bob Schwartz, Woodacre, Calif.

Alan Pearce, president of Information Age Economics, Inc., a Washington, D.C. telecommunications research firm, replies:

To be legal, a tariff must conform to the rules laid out in both the Communications Act of 1934

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Network management platforms

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Complete details about The Short List eppear on page 41.

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Apple demos Open Collaboration Environment at Mactivity '93

BY FREDRIC PAUL

San Jose, Calif.

Apple Computer, Inc. last week demonstrated for the first time the Apple Open Collaboration Environment (AOCE) in its final form and revealed details on how the architecture will link electronic mail, directory and security services to let Macintosh users work together more easily.

Originally announced at NetWorld 91 (*NW,* Nov. 25, page 17), AOCE is currently being beta tested by some 1,000 developers and 100 customers. "We're very close to [locking up the code] on this product," said Gursharan Sidhu, Apple's technical director of collaboration systems development. Apple plans to ship AOCE before the end of the summer and promised to have it running at MacWorld next month.

According to Andy Lauta, Apple's product manager for AOCE, the company plans to make AOCE available on additional platforms within six months of initial Macintosh shipments.

In its current incarnation, AOCE integrates several network enhancements into the Macintosh operating system, including a single universal mailbox, a catalog browser, a single logon feature for multiple net resources, a digital signature capability and the ability to mail from any application.

On the server side, "At Your Service" servers will consolidate and manage catalogs, provide store-and-forward capabilities (especially important for PowerBook users), and hold Service Access Modules for connections to additional messaging services. The servers will run only on System 7 platforms, not Apple AUX, Lauta said, and the initial release of AOCE will run only over AppleTalk, not Macintosh Transmission Control Protocol/Internet Protocol. It will support AppleTalk Remote Access, however.

The universal mailbox collects all types of mail — including public or private E-mail, facsimile and voice mail — in a single window accessible from the Macintosh finder. Users can sort and filter messages by subject, date, key word and other criteria.

To send mail, users simply drag and drop documents — from any application — onto the appropriate icon. They do not need to specify the recipient's location or how the message should travel. The preferred transport will be specified in the addressee's electronic business card, an open-ended repository for a range of information.

These business cards are collected into catalogs, a richer form of a directory. "Directories are an inappropriate term for the richness of data supported in a catalog," Sidhu said. "A catalog is not a directory in the same way that an encyclopedia is not a phone book."

Catalogs could encompass everything from conference rooms or other corporate resources to widgets or even code objects, not just people, Sidhu said. Using the AOCE catalog browser, users can access any sort of catalog. These catalogs are generally stored on the server, with folders corresponding to AppleTalk network zones, but users can also keep personal catalogs on their own machines.

PowerBook users can use their personal catalogs to work off-line, sending messages to a virtual "out" tray, and AOCE will take the appropriate actions when they are reconnected to the network.

The single log-on feature uses a "keychain" that includes encrypted versions of all appropriate passwords, modem settings, addresses and access information to all available communication services. Instead of having to remember multiple passwords and procedures, users log on once and get instant access to all appropriate services. Users can lock their keychain with a password to prevent access to all sensitive areas.

OCE encrypts all transmissions for privacy, and digital signatures, based on Public Key Encryption technology from RSA Data Security, Inc. in Redwood City, provide universal authentication. Users obtain their personal digital signature from an issuing authority; either from RSA or via license from their own company, and affix it to a document or portion of a document. Recipients can verify who signed it and if the document has been altered since it was signed.

This technology lets users verify signatures without connecting to a server, but leaves it up to users to manage their own signer files, Lauta acknowledged. Issuing authorities will maintain lists of compromised signer files, just as credit card issuers track stolen credit cards.

Overall, AOCE uses about 1M byte of additional random-access memory as system overhead, with an additional 100K bytes for each service access module for services such as Microsoft Mail, QuickMail, Message Handling System and X.400. The utilities will take up about 2M to 3M bytes of hard disk space.

Users on hold as problem hit 800 database

BY BOB WALLACE

Kansas City, Mo.

Problems with a Bellcore-maintained database caused headaches for 800-service users switching carriers under portability.

Bell Communications Research acknowledged last week that difficulties with its Service Management System (SMS) here put about 150,000 service updates on hold for roughly 16 hours Thursday, June 24.

"Backlogging of updates in the SMS meant calls were not completed to companies that were supposed to be ported to a different carrier," said Kelly Gaylord, executive director of signal control point development at Bellcore. "We don't know how many users were affected."

Gaylord said the problem was caused when the backup process slowed down due to an unusually high level of activity, forcing the SMS to put the updates in queue.

SMS is a key component in the new 800-portability environment, serving as a centralized database and operational support system through which long-distance carriers reserve, activate and deactivate 800 numbers.

SMS contains the records for all 800 service customers nationwide. It works with local telephone company toll-free routing systems to enable the carriers to switch calls to the appropriate long-distance company.

A Bellcore spokeswoman said there is a backup SMS in St. Louis, but she did not know whether it was used during the problem. Gaylord stressed that 800 service only affected users who were changing carriers.

Gary Sorensen, assistant national sales manager with Vitamix, Inc., a Cleveland-based health food products vendor, was having 800 traffic ported from AT&T to MCI Communications Corp. on the day of the problem. "We had outages totaling about four hours from the SMS situation and some other portability problems," he said. "We lost tons of calls that day, and it hurt us businesswide."

NETWORK MANAGEMENT

IBM's NetView/6000 goes beyond SNMP

BY MICHAEL COONEY

South Pasadena, Calif.

Diederich & Associates, Inc. last week announced software that extends the scope of IBM's NetView/6000 system beyond SNMP, enabling it to manage virtually any networked device.

The software, NetScript/6000, runs on a NetView/6000 Simple Network Management Protocol platform and translates non-SNMP management data coming from third-party devices into formats that NetView/6000 understands. It currently works with an array of management systems from vendors including Network Equipment Technologies, Inc. and Tandem Computers, Inc. but can be customized to support virtually any vendor's system.

"NetScript/6000 furthers the idea that NetView/6000 can be a manager of managers in multivendor user environments," said Richard Diederich, president of Diederich & Associates, an IBM management software development firm. "For the first time, NetView/6000 users will be able to issue commands and control non-SNMP devices from the NetView/6000 location."

NetScript/6000 monitors the status of non-SNMP devices and graphically represents them on the NetView/6000 monitor. If a device fails, its icon changes color. The operator can click on the icon, diagnose the problem and open a trouble ticket or kick off an automated response.

"For example, we can monitor all the way down to a port on a mux and issue restart or shut down commands from NetView/6000," Diederich said.

Users can customize the software to filter out unwanted data and set their own performance alarm thresholds. An alert summary is kept in NetView/6000's database for historical net management reports.

NetScript/6000 also supports most of NetView/6000's feature set, such as the ability to automatically "learn" the topology of the environment it is monitoring.

"Users don't have to go around gathering data about their devices because the NetView/6000 platform does that automatically," Diederich said.

NetScript/6000 can send management data to mainframe-based NetView through the NetView/6000's AIX service point.

"We let users have the choice of distributed or host-centric management capabilities," Diederich said.

NetScript/6000 is available now at an entry-level price of $5,000. The cost for each element management system interface is an additional $1,000 to $2,000.

☎ Diederich & Associates: (818) 799-9670.

Motorola Codex melds LAN, terminal traffic

BY JIM DUFFY

Mansfield, Mass.

Motorola Codex last week enhanced its 6500Plus packet switch to enable customers to mix token-ring local-area network traffic with terminal-to-host data over a single low-speed circuit.

The company rolled out a new release of the 6500Plus' software and a token-ring interface module that allows users at branch office sites to integrate bridged token-ring LAN and terminal-to-host traffic.

The 6500Plus is a low-end feeder switch that supports a maximum of 54 synchronous and asynchronous ports and a dedicated wide-area multidrop link at speeds of up to 384K bit/sec.

Besides support for source route bridging (SRB) token-ring traffic, Release 3.1 of the 6500Plus handles many new terminal-to-host data protocols, including SDLC Group Poll, which allows concentration of polls to remote sites for increased network efficiency, and 801 Autodialer, which eliminates the need for an external 801 Autodialer for scanned images.

The software also supports Burroughs Poll Select for Unisys Corp. applications and a Transparent Bit-Oriented Protocol (TBOP) Handler, which allows pipelined transport of framed data, meaning frame sizes are reduced to smaller frames to avoid serialization delay.

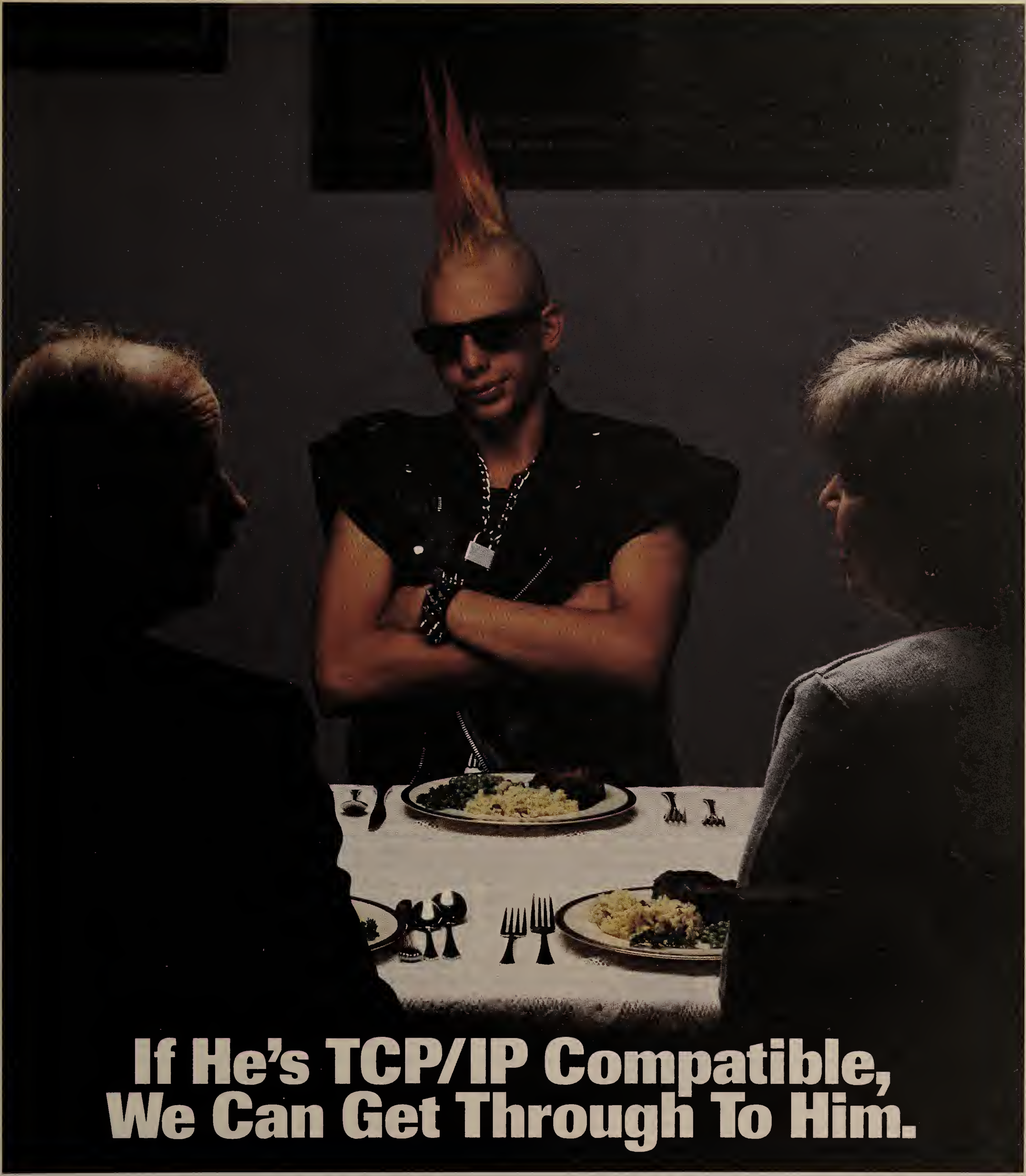
Lastly, the software's XDLC protocol supports multidrop installations of SDLC by allowing customers to roll out their SDLC networks site by site instead of simultaneously across the entire network.

The new token-ring interface module attaches one 4M or 16M bit/sec token ring to the 6500Plus switch.

The token-ring interface and Release 3.1 of the software will be available in the third quarter. Release 3.1 costs $500, while prices for the major features within the release are $500 for the SRB software, $750 for XDLC and $500 each for the other protocols.

The token-ring interface module costs $950. Pricing for a complete 6500Plus platform with token-ring and terminal-to-host protocol support starts at $4825.

☎ Motorola Codex: (508) 261-4000.



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3Com fills in details of its ATM local net strategy

BY SKIP MACASKILL

Birmingham, England

3Com Corp. last week fleshed out its Asynchronous Transfer Mode (ATM) strategy, saying it will add ATM support to its LinkBuilder Multi Services Hub (MSH) and NetBuilder II bridge/router, and partner with an unnamed ATM switch vendor.

The strategy, dubbed High Performance Scalable Networking (HPSN), will enable customers to build routed ATM collapsed backbones consisting of ATM-ready MSH and NetBuilder II products, as well as a 3Com-sold ATM switch.

"Unlike ATM vendors that are taking the technology and bringing it into the traditional LANs, we're taking the user from where they are today and providing a migration path to ATM using products that are currently available," said Edgar Masri, director of business development for the firm.

A year ago, 3Com mapped out its statement of direction on ATM, which included plans to deliver the technology in backbone, desktop and wide-area environments (*NW*, July 20, 1992, page 2). HPSN defines how 3Com will support a backbone net that links local-area nets within a building.

In the first stage of HPSN, 3Com will prepare the NetBuilder II for ATM integration by increasing port density and providing it with the ability to support virtual LANs. The company contends that the advent of ATM will bring about a need for more LAN segments, higher throughput demands and the ability to group users in logical LANs within the building.

The new high-density modules for the bridge/router will be available by the end of this summer, and the virtual LAN software will be available in the first half of next year.

In the second phase, 3Com will add ATM capabilities to both the MSH and NetBuilder II via a new CellBuilder module, which converts token-ring and Ethernet packets into 53-byte ATM cells.

The CellBuilder will enable users to increase the efficiency of inverted backbones by using the NetBuilder II to support 155M bit/sec ATM links to hubs on different floors. It will not, however, provide full ATM network capabilities because the ATM cells will have to be converted back to packets to be routed.

The CellBuilder modules for both the MSH and NetBuilder II will be available in the second half of next year.

In the third stage, 3Com will roll out an ATM switch, which will be provided through a partnership with an as yet unnamed ATM switch vendor and connected to the NetBuilder II and the MSH via ATM links.

The switch will handle the physical transfer of data between multiple ATM resources, while the router will manage the call setup process and provide the needed routing features between traditional LANs or between an ATM segment and a traditional LAN.

Delivery of the ATM switch and software enhancements to the NetBuilder II, which will allow it to handle the call setup process, are expected by the first half of 1995.

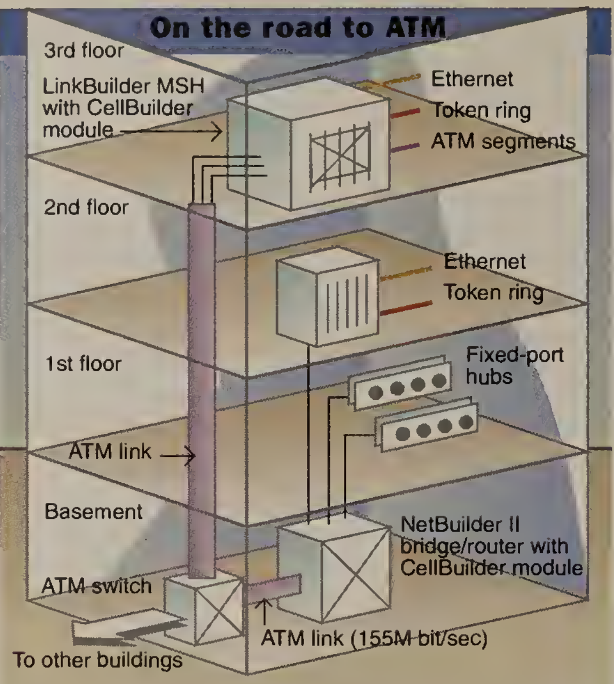
The strategy is a good one for 3Com in light of its roughly 10% share of the router market, said one industry observer who requested anonymity.

"For a major router vendor to start talking about a strategy like this is dangerous because they're going to cut into near-term sales," he said. "But if you're a router vendor that doesn't seem to be winning the war — such as 3Com — you go to the next war front, which is ATM."

While analysts praised the 3Com strategy, they pointed out that some questions still remain. "In general, 3Com's strategy reflects how user environments will probably evolve, but questions remain on how it will integrate its product lines to make this happen," said Val Sribar, senior research analyst at META Group, a consultancy in Reston, Va. "The management challenge is also a big one."

© 3Com: (408) 764-5000.

On the road to ATM



In 3Com's routed ATM strategy, an Asynchronous Transfer Mode switch and bridge/router will work together to interconnect the traditional LANs and ATM segments in a building environment, with the switch providing the high-speed data transfer and the router processing call setup and routing decisions.

SOURCE: 3COM CORP., SANTA CLARA, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

NETWORKING DOS

IBM offers built-in LAN client support in DOS 6.1

BY CHRISTINE BURNS

New York

At last week's PC Expo here, IBM's Personal Systems Programming (PSP) division offered a new version of the venerable DOS operating system that makes it simpler to hook PCs into a local-area network.

IBM's DOS 6.1 will be shipped at the end of the month with a built-in networking feature, called DOS LAN Services, that automatically transfers client requests for shared file, print and other services to a LAN server. DOS LAN Services is set up during installation of DOS 6.1 and supports OS/2 LAN Server, IBM PC LAN Program and Microsoft Corp.'s LAN Manager and Windows for Workgroup.

This same functionality is provided by IBM's DOS LAN Requester, which must be purchased for each client on a LAN Server network. IBM has similar LAN Server requesters that it sells separately for OS/2, Windows, Macintosh and Unix clients.

Susan Rubino, PSP system manager, said making the requester part of the operating system is convenient. "You put it on your desktop, plug in an adapter card, and you're on the network," she said. Users were able to download the requester to each client from LAN Server, but DOS LAN Services "cuts out that extra step."

RUBINO

Although DOS LAN Services only supports shared print and file services, Rubino said that, in the future, it will provide DOS clients with access to Open Software Foundation, Inc.'s Distributed Computing Environment (DCE) services on LAN Server. IBM began shipping DCE directory, security and timing services for its AIX operating system last December. The same services for OS/2 are in beta test, and IBM has indicated plans to support them in LAN Server in the near future.

According to Rubino, DOS is too memory-constrained to handle DCE services on its own.

Along with DOS LAN Services, DOS 6.1 includes new backup, memory management and scheduling utilities from Central Point Software, Inc., IBM's Anti-Virus Technology and real-time data compression capabilities using Addstor, Inc.'s SuperStor/DS. It also supports Personal Computer Memory Card International Associ- ation cards through an agreement with Phoenix Technologies, Ltd. and Pen-DOS extensions.

Steven King, IBM LAN Server product manager, said IBM is currently negotiating arrangements with several personal computer manufacturers so DOS LAN Services would be preloaded on hardware with the vendors' OEM version of DOS 6.1.

Mike Hart, an analyst with Framingham, Mass.-based consultancy MGT Technology Group, said DOS LAN Services provides a clean way for DOS to recognize that a drive it is searching for is located on the network and to carry out requests for file or print services.

Hart said he would like to see DOS 6.1 enhanced further with integrated support for multiple protocol stacks, which would enable a DOS client to operate across diverse LANs.

King said IBM has noticed growing customer demand for this type of net-enabled operating system.

IBM customer Jim Dertzbaugh, vice president of the technical service group at Integrated Communications Solutions in Fredericksburg, Md., said DOS LAN Services may be convenient but will not have a big impact on networking at his company.

"In practical terms, this function isn't really going to make much of a difference to us," he said.

©IBM: (800) 426-2468.

Army looks to ATM as lifeline for battlefields

BY BILL BURCH

Washington, D.C.

On patrol in Mogadishu, a soldier is hit by sniper fire, and bullet fragments scatter throughout his chest cavity. Medics rush him to the field hospital where U.S. Army surgeons scrub up and the patient is prepped.

But before they begin cutting, the doctors take a moment to consult with thoracic specialists at Walter Reed Army Medical Center in Washington, D.C.

They discuss the patient's appearance, vital signs, X-rays and medical history, all carried by an Asynchronous Transfer Mode link from the heat and dust of Somalia back to air-conditioned hospital offices in the U.S. As the operation proceeds, the specialists peer over the surgical team's shoulders via video camera, backing up the surgeons with cooler heads than are possible in the heat of the moment.

Given the go-ahead by the Department of Defense, this scenario could soon become reality. The Army last week demonstrated such a system using an ATM link that connected Walter Reed and the University of Virginia's (UVA) medical hospital in Charlottesville, Va., with the U.S. Army Reserve's 18th Field Hospital at Fort Gordon in Georgia.

In the demonstration, field personnel fed simulated vital signs data into an ATM switch from Fore Systems,

DG aims high in multiprocessor Unix server mart

BY BOB BROWN

Westborough, Mass.

Data General Corp. last week announced two new symmetrical multiprocessing servers, including one that can be configured with a maximum of 16 processors, as well as a new version of its Unix operating system.

The new AViiON 9500 and 8500 server models, as well as Version 3.0 of DG's DG/UX Unix operating system, provide a host of mainframe-like fault-tolerant features that better position DG as a provider of servers for enterprise and departmental nets.

DG's new servers are designed with basically the same architecture but use different packaging, with the Model 8500 better suited for branch offices and the rack-mountable Model 9500 better for data centers.

The AViiON 9500 is DG's highest end Unix server yet, scaling from two to 16 processors, which allows users to expand it from a low-end to high-end system simply by adding new processing boards.

The top-of-the-line AViiON 9500 server packs more

Correction

In the story "New breed of wireless LAN to debut at PC Expo" (June 28, page 8), David King's company affiliation was misstated. King is the vice president of marketing for Proxim, Inc. in Mountain View, Calif.

Clarification

Tantara Technologies, Inc.'s KnockKnock net management software (June 7, page 9) is being distributed by Qualix Corp. For more information, call (415) 572-0200.

Inc., as well as X-ray scans and a live video feed showing the patient. The medics were able to monitor the data being sent back to the hospital via an on-site workstation.

Although the combined traffic only added up to 4M bit/sec, the Fore switch was linked via a 45M bit/sec T-3 fiber line to a Sprint Corp. point of presence in Augusta, Ga. From there, the data traveled via microwave to a Sprint ATM switch in Relay, Md., and was then delivered over separate T-3 links to the UVA hospital and Walter Reed.

At Walter Reed, specialists crowded around a Sun Microsystems, Inc. SPARCstation 10 with four open windows showing medical histories, vital signs monitors, high-resolution X-rays and a stop-motion video of the patients. The surgeons then advised the field personnel through an audio backchannel.

REACTION

Despite having fairly high-quality imaging on screen, the Walter Reed specialists seemed hesitant to accept the data as it appeared and often asked the staff on-site to confirm details of the case, whether due to caution in taking on a new case or uncertainty over the new technology's reliability.

Army doctors were somewhat familiar with telemedicine from using digitalizing cameras and satellite links to transmit images of X-rays, wounds, malaria smears, skin rashes and microscope slides. In the case of X-ray transmissions, the new system may be marginally better than the old in terms of picture quality, according to Walter Reed's Capt. Gordon Murray, chief of computer services, and Fred Copeman, chief of clinical automation.

The old system's resolution fluctuated with the quality of the printer used to run a hard copy at the hospital's end; the new system relies on an on-screen display with a resolution of 72 by 300 dots per inch. But the new system improves on the old in terms of speed, Murray said. Scanning X-ray images for transmission and then sending them via satellite took about 20 minutes.

The new system provides real-time video but comes with imposing transport requirements, according to one system engineer from the Defense Department. "It's wonderful, but how many DS3s can you pipe into the battlefield?" he asked.

That aside, the trial did demonstrate the speed with which such a network can be established. The Army decided to go ahead with the project just six weeks before the trial, and setting up the system took one week, according to William Hilsman, chairman of systems integrator InterDigital Communications Corp. in Philadelphia.

New AViiON server skinny

Product	Number of processors	Price	Availability
AViiON 9500	2	$84,000	Now
	4	$104,000	Now
	6	$124,000	By year end
	8	$144,000	By year end
	12	$220,000	2Q 1994
	16	$280,000	2Q 1994
AViiON 8500	2	$36,000	Now
	4	$56,000	Now
DG/UX 5.4 Release 3.0 operating system		$500 - $25,000	By year end

SOURCE: DATA GENERAL CORP., WESTBOROUGH, MASS.
GRAPHIC BY TERRI MITCHELL

performance than earlier AViiON servers and allows DG to stack up better against Pyramid Technology Corp. and Sequent Computer Systems, Inc. at the high end of the Unix server market. The AViiON 9500, configured with 16 symmetric multiprocessing processors, boasts four times the performance than that of the current high-end AViiON server, Model 6280.

The AViiON 8500 is available in two- and four-processor configurations.

Key new features not offered in earlier AViiON products include redundant CPUs, memory and I/O controllers that can be swapped out without interrupting server operation.

"We have capabilities available on a single system that before were available only by using multiple systems," said Paul Marcucci, product manager for the AViiON 9500 and 8500 servers at DG.

Mitchell Stevelman, vice president of MIS at High Yield Management Securities, Inc., a Clifton, N.J., securities firm, said the AViiON 9500's fault-tolerant features were a key consideration in his company's decision to install the product. The firm is replacing five Motorola, Inc. 88100 servers with a single AViiON 9500, he said.

"If we miss a trade by a matter of minutes, it can cost someone millions," Stevelman said. "I needed a server with as many fault-tolerant features as I could find."

Version 3.0 of DG/UX complements the fault-tolerant features of the AViiON 9500 and 8500. Highlights include a bundled version of Legato Systems, Inc.'s Networker net backup offering and support for multithreaded applications.

The AViiON 9500 is available now in two- and four-processor configurations beginning at $84,000 and $104,000, respectively. Later this year, DG will make available the six- and eight-processor models at $124,000 and $144,000, respectively. The 12- and 16-processor models will be released next spring and cost $220,000 and $280,000, respectively.

The AViiON 8500's pricing starts at $36,000 for a two-processor system and $56,000 for a four-processor system. Both versions are available now.

DG/UX 5.4 Release 3.0 will ship by year end and cost from $500 to $25,000, depending on the number of users.

☎ DG: (800) 328-2436.

Client/server tool eases development tasks

BY WAYNE ECKERSON

Boston

Progress Software Corp. last week announced a new version of its client/server development system that makes it easier to build complex applications that work across multiple platforms.

Introduced at the annual Progress Users Conference here, the new version optimizes connections to third-party databases and lets developers build graphical applications that can be deployed across diverse systems.

It also provides an application debugger, a graphical report writer and a facility for translating applications into different languages. The Progress relational database has been upgraded with support for triggers and key word searches, among other things.

Progress officials said Version 7 is geared toward users that have experimented with departmental-level client/server applications and want to expand those applications across an enterprise.

Beta users agreed. "We evaluated tools from lots of vendors, including Oracle [Corp.] and Powersoft [Corp.], and Progress was by far the most functional," said Dwight Davis, director of information systems at Johnson Controls, Inc. in Milwaukee. "The only tool

See **Progress**, *page 52*

ODS teams with Cisco for router modules

BY SKIP MACASKILL

Richardson, Texas

Optical Data Systems, Inc. (ODS) this week will announce a strategic partnership with Cisco Systems, Inc. that will result in the integration of routing capabilities in the low end of ODS' Infinity intelligent hub line.

The hub maker will offer three modular versions of Cisco Series 3000 routers for use in four- and seven-slot Infinity hubs installed at remote sites.

"The 3000 line is geared to remote access functionality, so the integration into the Infinity will enable a net manager to support the router and hub requirements at remote sites via one device," said Terry Gaston, vice president of marketing at ODS.

The modules, which take up two slots in the Infinity chassis, will be available in three configurations: a two-port local Ethernet bridge/router; a model with one Ethernet port and one synchronous serial port; and a version with one token-ring port and one serial port. The serial ports will support speeds of up to 4M bit/sec via a variety of interfaces, including RS-232, RS-449, RS-530, V.35 and X.21.

All models will support a range of network protocols, including the Transmission Control Protocol/Internet Protocol, Novell, Inc. Internetwork Packet Exchange (IPX) and AppleTalk, among others. The Routing Information Protocol and Open Shortest Path First will also be supported.

"Cisco's remote AutoInstall feature, which lets the router automatically learn its net address and download configuration information from the corporate site, makes it a great fit at a remote site where experienced support technicians are in short supply," Gaston said.

Gaston also left the door open for future routing integrations involving Cisco.

"If our users demand it and it makes sense for both us and Cisco, we will definitely pursue integration of other Cisco models," he said.

Currently, ODS offers high-end and mid-range integrated bridge/routers from both Wellfleet Communications, Inc. and Network Systems Corp.

The Cisco modules for the Infinity hub are available now. Pricing starts at $5,495 and depends on configuration.

☎ ODS: (214) 234-6400.

Clinton chooses new chairman to head FCC

BY BILL BURCH

Washington, D.C.

President Bill Clinton last week announced that he would nominate fellow Yale Law graduate Reed Hundt to replace Al Sikes as chairman of the FCC.

HUNDT

Hundt is a 45-year-old attorney who has been with the law firm of Latham & Watkins here since 1975 and is a founding member of its telecommunications practice group. He served as an advisor on economic issues to Vice President Al Gore since 1984, and was a senior adviser with the Clinton campaign in 1991.

The nominee's recent work has covered such new technologies as cellular phones, wireless cable, direct broadcast satellite and interactive television. Hundt also has experience in antitrust and First Amendment issues.

"I've worked with him for 10 years, and he's an excellent lawyer, a smart man, an open-minded man," said Gary Epstein, a Latham & Watkins attorney and a former Federal Communications Commission Common Carrier Bureau staff member. "I think he'll make a great chairman."

Reaction from other parties was similarly enthusiastic. Thomas Stroup, president of Telocator, a trade association for the paging and cellular industry, said he is pleased with Clinton's choice and looks forward to working with Hundt in the development of personal communications services (PCS).

At the Consumer Federation of America, legal counselor Bradley Stillman said Hundt's appointment could move the commission away from a knee-jerk attitude concerning deregulation.

"He's going to understand the risks to consumers and to potential competitors of acting prematurely to deregulate an industry that still has the ability to control and, in effect, run roughshod over any fledgling competitors," Stillman said.

If confirmed as FCC chairman, Hundt will be working with the Clinton administration on Gore's plan for a national information infrastructure. Other issues facing the commission in coming months include assigning spectrum for PCSs, possible reform of the AT&T consent decree and local interconnection for competitive access providers.

Hundt faces confirmation hearings before the Senate Commerce Committee, followed by a vote on the Senate floor.

Former FCC Chairman Sikes resigned when Clinton took office. With the departure of FCC Commissioner Sherrie Marshall, the commission has been working with a three-member quorum. Clinton has one remaining position to fill within the FCC.

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*AT&T SDN Voice Mail is an optional feature of SDN.

AT&T

Firm unveils controller for Novell LANs

BY MAUREEN MOLLOY

Minneapolis

Bus-Tech, Inc., a subsidiary of Network Systems Corp., last week announced a communications server that provides the hardware and wide-area connections needed to give local and remote Novell, Inc. Netware LANs access to IBM hosts.

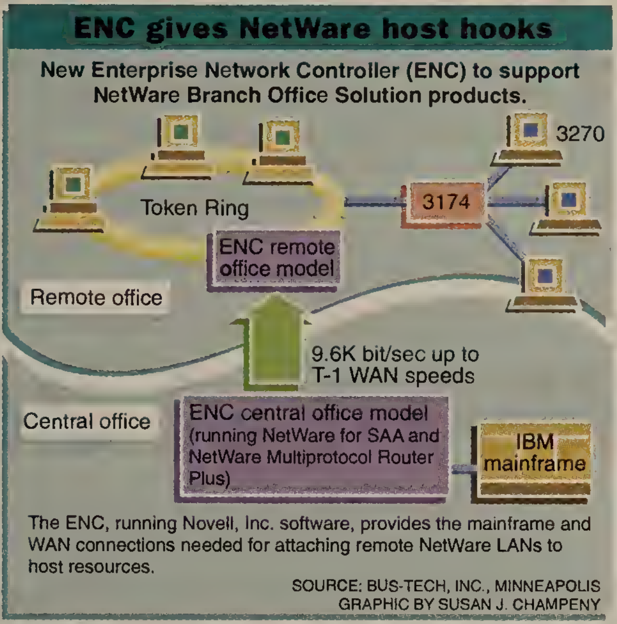
The new Enterprise Network Controller (ENC) works with Novell's recently announced NetWare Branch Office Solution software, which includes the network operating system (NOS), host gateway and other functions needed to set up remote local-area networks and give them host access. Bus-Tech's ENC, meanwhile, supplies the required mainframe channel connections and wide-area network links.

The ENC is based on an Intel Corp. 80486 microprocessor that can be upgraded to a Pentium processor. It is equipped with 16M bytes of memory and redundant 250M bytes of disk array storage.

The product is available in two models. The first is intended for central data centers and can support up to eight bus and tag channel interfaces and as many as 10 WAN interfaces at speeds from 9.6K bit/sec to T-1. In the future, it will support IBM Enterprise System Connection channels, too.

The second model is targeted at remote sites to function as a NetWare LAN server and host gateway. It too can support as many as 10 WAN interfaces at speeds from 9.6K bit/sec to T-1.

Both can run Novell's Branch Office Solution products, which consist of two packaged versions of the vendor's existing NOS, wide-area connectivity and management products designed to make it easier and less expensive for users to install LANs at remote sites (*NW*, June 28, page 6).


ENC gives NetWare host hooks

New Enterprise Network Controller (ENC) to support NetWare Branch Office Solution products.

3270
Token Ring
3174
ENC remote office model
Remote office
9.6K bit/sec up to T-1 WAN speeds
Central office
ENC central office model (running NetWare for SAA and NetWare Multiprotocol Router Plus)
IBM mainframe

The ENC, running Novell, Inc. software, provides the mainframe and WAN connections needed for attaching remote NetWare LANs to host resources.

SOURCE: BUS-TECH, INC., MINNEAPOLIS
GRAPHIC BY SUSAN J. CHAMPENY

The products — dubbed NetWare SNA Branch Office and NetWare Internetworking Branch Office — both run on a single server at the branch site. They are designed to be installed, administered and managed from a remote central console, thereby enabling users to install remote LANs that can connect to IBM mainframe resources.

The NetWare SNA Branch Office consists of NetWare 3.11 or NetWare 4.0, in addition to NetWare for SAA, NetWare Global MHS, NetWare SNA Links, NetWare Hub Services and the Network Management Agent.

NetWare Internetworking Branch Office is similar to SNA Branch Office but uses Novell's Multiprotocol Router Plus instead of the NetWare for SAA and NetWare SNA Links, thereby enabling the LAN to be connected to a router-based backbone.

Combined with Novell's LAN products, the ENC will support capabilities such as database lookups, centralized backup and asset management.

Pricing for the ENC, which will be available by year end, starts at $25,000.

✆ Bus-Tech: (215) 540-2212.

MANAGEMENT ROUNDTABLE

Apps integration drives systems mgmt.

BY JOHN RYMER

The vision of network and systems management is based on two assumptions.

First, no single vendor can deliver everything users need. Some specialize in building platforms, such as SunConnect's SunNet Manager and OpenView from Hewlett-Packard Co., while equipment vendors focus on building element management applications that rely on these platforms to collect information from their devices, be they muxes or modems.

LOH

The second assumption is the emergence of stable management platforms will spur development of generic management applications for functions such as trouble ticketing, system administration and accounting.

Users will need to integrate these applications to create a comprehensive, interactive management environment. For example, a user can benefit by being able to launch diagnostic routines for a faulty piece of equipment from within a trouble-ticketing program.

But the need for management application integration is better understood than the means for achieving it.

Recently, *Network World* assembled a group of users and vendors for a roundtable discussion aimed at clarifying the issues associated with management application integration.

GIL

Participants included Hong Loh, vice president of communications engineering at Banker's Trust Co. in New York; Reynaldo Gil, technology planner for Charles Schwab & Company, Inc. in San Francisco; Christopher Slatt, chief executive officer of Networx, Inc. in Bellevue, Wash.; Allwyn Sequeira, director of the network management business unit at Ungermann-Bass, Inc. in Santa Clara, Calif.; Peter Norwood, vice president of emerging markets at Tivoli Systems, Inc. in Austin, Texas; Garry Baer, Distributed Management Environment technology manager at the Open Software Foundation, Inc. (OSF) in Cambridge,

See **Integration,** *page 14*

BRIEFS

Cisco Systems, Inc. last week awarded the first annual Cisco Circle Award to Vice President Al Gore in recognition of his leadership in building global awareness of computer networking through the National Information Highway Initiative.

The Cisco Circle award carries with it a $10,000 donation to the educational institution of the recipient's choice.

The award will be presented annually to noncommercial technical innovators and visionaries who have demonstrated leadership in building a global data networking infrastructure.

Wellfleet Communications, Inc. President Paul Severino has been named New England Entrepreneur of the Year in an awards program sponsored by Ernst & Young, *Inc. Magazine* and Merrill Lynch & Co., Inc. Severino will compete with other award winners being announced in 40 other locations nationwide for the national Entrepreneur of the Year.

Wellfleet last week also announced that it is ramping up efforts in the Pacific Rim countries by establishing three offices in Australia, Japan and Singapore.

General DataComm, Inc. last week announced a T1-ATM interface for its APEX Asynchronous Transfer Mode switch. Currently in beta-testing, the T1-ATM interface will be available in September. No pricing has been set.

General DataComm: (203) 574-1118.

See **Briefs,** *page 14*

Key opens door to client/server maze

BY MICHAEL COONEY

Albany, N.Y.

The big iron at this shop may be a little rusty, but it is not yet ready for the scrap heap.

Key Corp., a bank and financial services holding firm, is moving applications onto local-area networks and crafting a new role for its two mainframes in its distributed, client/server network.

"We don't talk about the mainframe as 'the mainframe' any more; it is just another processing node on the network," said Robert Tucker, general manager of information resources and technical operations for the company. "What we have is a large network with different sized processors running a variety of banking and financial service applications."

Key has a large Systems Network Architecture-based backbone anchored by two IBM ES/9000 Model 860 mainframes, one here and one in Tigard, Ore. The mainframes are tied to token rings that support 900 branch offices in 51 cities throughout 10 states.

Each branch has a 4M or 16M bit/sec token-ring LAN tied to one of the mainframes via 9.6K or 56K bit/sec links. Multiple redundant T-1 lines connect the mainframes to each other.

The two mainframes are mirror images of each other in terms of applications and databases. The Tigard mainframe handles West Coast transactions, while the East Coast is handled from Albany. Either site could handle all of the company's transactions in the event of a disaster. In fact, the two data centers trade off control of the entire network two weeks out of the month to prepare for such an emergency.

About two years ago, Key began moving some of its mainframe applications to the LANs in an effort to improve customer service. "We felt we could offer faster, more convenient service to our customers by having some applications at each branch office, rather than having everything on the mainframe," Tucker said. "This has saved on mainframe cycles, cut down on operator errors, reduced our paper load and improved our customer service."

The firm has also helped itself internally by distributing its corporate budgeting process. Each bank branch now has the capability to produce its own yearly budget and track local performance against it. "We've taken

See **Key,** *page 13*

Pricing

Continued from page 1

enough to accommodate a range of needs, there are changes in the works.

"We have been meeting with customers and they are correct in asking for a reevaluation [of prices], especially as they move to larger files and multimedia," said George Cunningham, vice president of business planning and development for AT&T EasyLink Services and chairman of the Electronic Mail Association (EMA). "It's going to be an issue over the next couple of years. As we go forward to multimedia, carriers are going to have to look at a different pricing paradigm."

Much of the traffic carried over the AT&T EasyLink Services net consists of mail-enabled applications rather than basic interpersonal text messages, Cunningham explained. Few users have actually started sending multimedia traffic, such as messages — including video and voice attachments — although he expects that will happen.

"There is more desire for fixed-priced messaging, especially as our customers move to LAN-centric environments," Wolfe said.

Cunningham said pricing is only one issue that arises in supporting more complex messaging applications. Carriers will need to provide higher speed access links and revamp their network infrastructures in order to support new types of messaging.

Bill Wolfe, director of marketing for electronic messaging at Infonet Services Corp. in El Segundo, Calif., said his company is looking to offer fixed-rate pricing "in a short period of time" as an option with all of its messaging services, including basic mailbox services.

"There is more desire for fixed-priced messaging, especially as our customers move to LAN-centric environments," said Wolfe, who declined to discuss specifics about Infonet's fixed-rate pricing plans.

Jay Sheth, director for messaging services at Sprint International, said the character-based pricing Sprint offers for its SprintMail mailbox service and its message switching service is suitable for many, but not all applications. Sprint also offers connect-time pricing — a charge for the amount of time spent on the network — for its message switching services and works out custom arrangements, which might include flat-rate pricing, for unique applications, he added.

Another Sprint spokesman said the carrier will likely offer users fixed-rate pricing for "all they can eat" messaging. However, he said that demand for such pricing probably won't be high for several years.

USER WARNINGS

But Steve York, manager of enterprise infrastructure support at Hughes Electronics in Long Beach, Calif., said he would welcome new pricing options right away.

"I'd like to buy a virtual circuit that would be priced at something greater than I'm paying today just for access, but less than I would pay for the total volume of traffic on a per-character basis," he said.

Roger Mizumori, manager of messaging services planning at Boeing Computer Services in Bellevue, Wash., said he thinks there are a lot of advantages to be had from flat-rate pricing.

"Right now, the way the [value-added network providers'] pricing structures are, something has to change," he said. "We haven't done a real extensive study to say that flat-rate pricing is definitely the way it has to be, but we are encouraging the [value-added network carriers] to investigate it."

Most users are not yet transmitting true multimedia documents across public mail networks, so carriers have some time to plot their pricing strategies. But if they fail to respond to changing needs, users say they will search for alternatives.

Don Gilbert, information systems director at the American Petroleum Institute in Washington, D.C., said some petroleum firms are looking to bypass public messaging services by purchasing X.25 pipes from carriers and handling message management themselves.

Marion Weiler, senior applications analyst for base technology at Chevron Corp., said during a recent EMA conference session that the Internet may be another alternative.

That same theme was echoed by Dan Blum, a principal at Rapport Communication, a consultancy in Cincinnati.

"With lower pricing available from the commercial Internet community, it's only a matter of time before public carriers will have to change and lower prices," Blum said.

The public E-mail carriers argue, however, that commercial Internet pricing is still evolving and that there are real security concerns about sending mission-critical information over the Internet.

Still, Gary Rowe, a principal at Rapport, said messaging service providers have no choice but to respond to user demands. "Carriers can't continue to effectively use the same pricing models they did when all users were shipping text," he said. ◼

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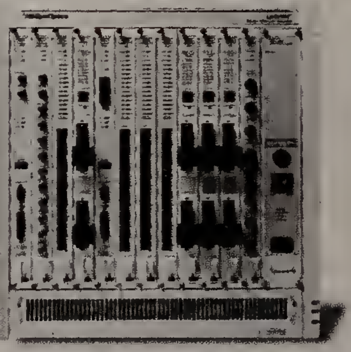

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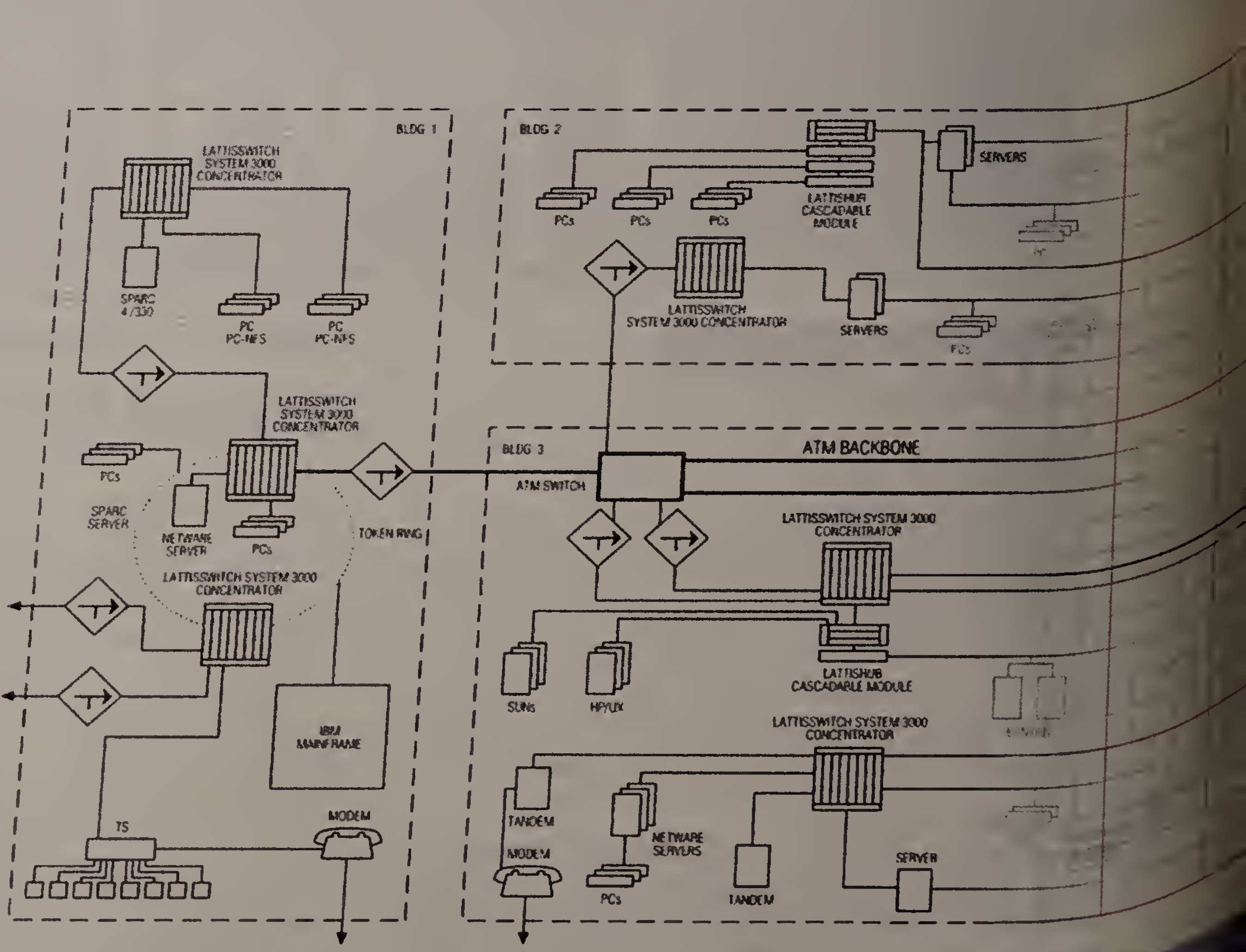
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Key

Continued from page 11

what was a centralized, mainframe budget preparation activity and moved it to the LANs," Tucker said. "All of the distributed budgets are then reported back to our central Albany office, where we can create an accurate corporate budget."

Another key application moved to the LAN was loan applications. In the past, customers filled out paper-based loan forms, from which data was later manually keyed in to a mainframe-based application that approved or denied the loan — a procedure that could take days and sometimes weeks, Tucker explained. Now each loan officer uses a LAN-attached personal computer running the loan approval application, and they enter customer data on-screen. In the background, the application accesses the customer's history from the mainframe and combines it with the local data, and the deal can be complete in about an hour.

"Our goal is to get loan approvals in 15 minutes, and someday we hope customers will be able to do everything over the phone so that all they have to do is come in and sign the loan papers," Tucker said.

While the firm has moved some applications off the mainframe, it by no means will eliminate the big box from its networking plans. "We view the mainframe as an integral part of the distributed client/server environment we are building," Tucker said. "If you have files on six million customers and two years of historical data on most of them, the mainframe is the only machine that can handle those types of transaction loads."

The firm still uses the mainframes for its financial accounting and checking and savings account records. ◻

INTERNETWORKING MONITOR

by Scott Bradner

Even more on standards

In my last column, I lamented the fact that Internet requests for comment (RFC) were not seen as "real" standards and I threatened to continue my discussion of the RFC process. The time is now, the threat fulfilled...

In reality, the RFC standards process has the kind of structure that standards lovers seem to want. But this was not always the case. The first RFCs were written by the "good old boys" who were implementing the Transmission Control Protocol/Internet Protocol at the time. (They weren't quite so old then, but they claimed they were good nonetheless.)

The RFC process allowed anyone to propagate an idea for a protocol or an application. There was no real review process except trial by semipublic fire — semipublic since the community was then quite small.

Things are rather different now. The Internet standards process is under the auspices of the Internet Society, which was formed within the past two years as a professional society focused on the Internet and its evolution.

The Internet Architecture Board (IAB) is an outgrowth of the old Internet Activities Board (also known as the IAB — they did not want to reprint the stationary). The IAB is chartered by the Internet Society to oversee the standards process.

The IAB approves the appointment of members to the Internet Engineering Steering Group (IESG), which consists of the Internet Engineering Task Force (IETF) area directors, some at-large members and a chairman shared with the IETF. (Enough layers for you structure lovers?)

Individual standards are generally produced through the actions of an ad hoc working group within an IETF area — an area being merely a convenient way to divide up topics. Membership in working groups is open.

Although they meet on their own and during the three IETF gatherings held each year, working groups do most of their work via electronic mail over the Internet. After a working group completes a draft standard, it is made available for review through anonymous ftp at a number of sites around the world.

After the review period, the group's work can be handed over to the IESG, which reviews it and any comments received. The IESG can recommend the document as a proposed standard, and an RFC number is assigned to it by the RFC editor.

After an additional review period, the document can be considered for elevation to draft standard status. Then comes yet another

See **Standards**, *page 14*

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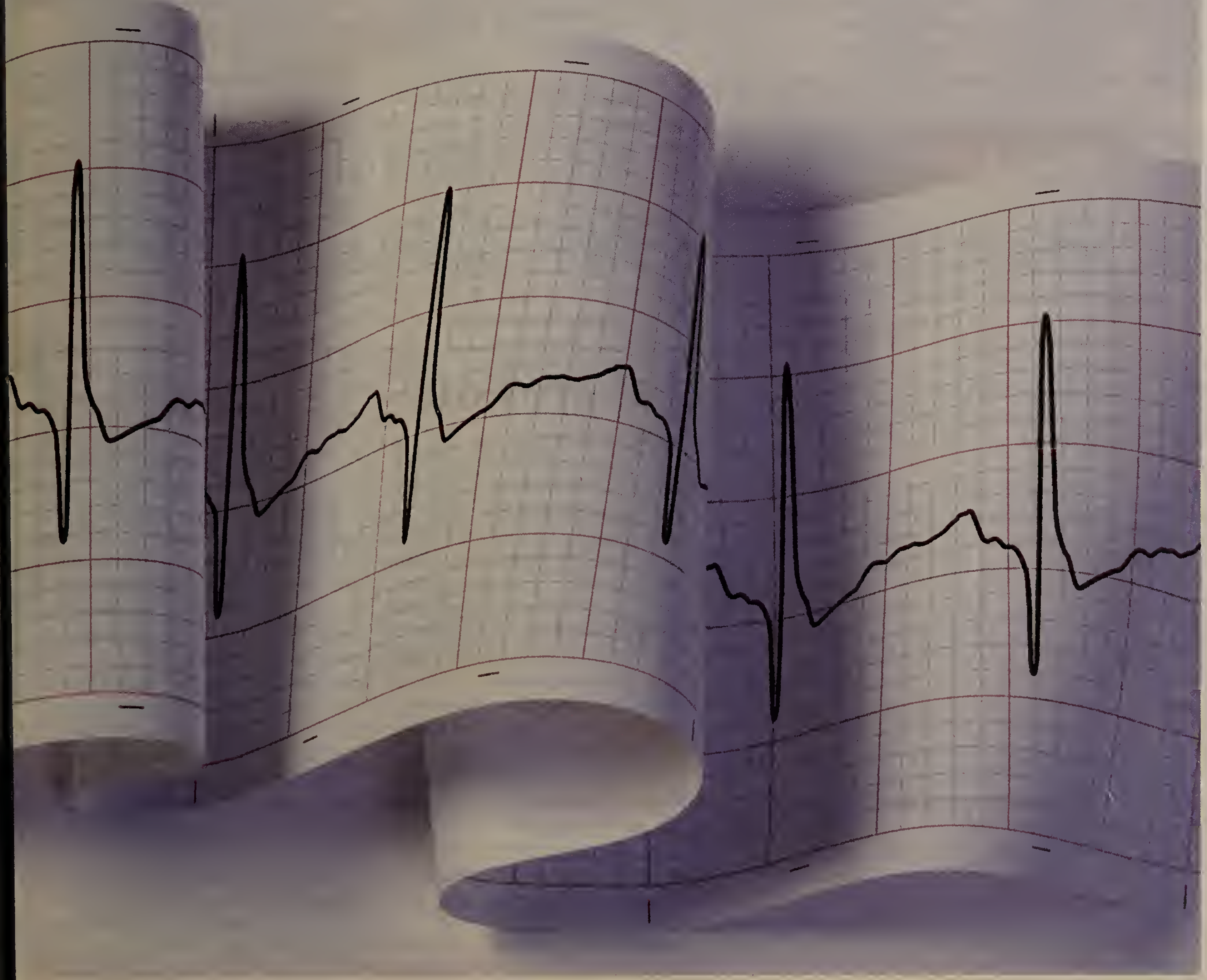


DEC announces long-awaited low-end DECbrouter 90

BY JIM DUFFY

Maynard, Mass.

Digital Equipment Corp. last week announced its long-awaited DECbrouter 90, a low-end access router codeveloped with Cisco Systems, Inc.

The DECbrouter 90, development of which was disclosed more than a year ago (*NW*, Feb. 10, 1992, page 2), can serve as a standalone device or fit into DEC's DEChub 90 Ethernet hub. Targeted at remote branch offices requiring access to a corporate backbone internetwork, the product supports one Ethernet attachment and either one T-1 link or dual wide-area links of T-1 and 64K bit/sec.

The DECbrouter 90 is the first DEC router to support SNA/SDLC and IGRP.

The new router supports a slew of routing protocols, including Cisco's Internet Gateway Routing Protocol (IGRP), Integrated Intermediate System to Intermediate System (IS-IS), Open Shortest Path First, Routing Information Protocol (RIP), Internetwork Packet Exchange (IPX) RIP, AppleTalk Routing Table Maintenance Protocol, Exterior Gateway Protocol and Border Gateway Protocol.

It also features a number of network protocols, including the Transmission Control Protocol/Internet Protocol, DECnet Phase IV, DECnet/OSI, Open Systems Interconnection, Novell, Inc.'s IPX, AppleTalk Phase II, Xerox Network Systems, Banyan Systems, Inc.'s VINES and IBM's Systems Network Architecture/Synchronous Data Link Control.

The DECbrouter 90 is the first DEC router to support SNA/SDLC and IGRP, said Abbot Gilman, DEC's marketing manager for network interconnect products. SNA traffic is supported by encapsulating SDLC traffic in IP packets.

Cisco's contribution to the router development effort was its IGRP code, allowing the product to interoperate with Cisco routers.

''Up until this point, we've had a hard time being included in the Cisco market because we didn't support IGRP,'' Gilman said. He declined comment when asked if IGRP support is planned for DEC's other routers, such as the DECwanrouter 90 and DECNIS backbone routers.

Cisco also contributed software that converts DECnet Phase IV packets to DECnet/OSI packets. The router accomplishes this by adding a string of bits that map a Phase IV address to a DECnet/OSI address.

For bridging, the DECbrouter 90 supports the Spanning Tree Protocol, which prevents Ethernet packets from continuously traversing a network of interconnected bridges. Supported data links include HDLC, Point-to-Point Protocol, X.25, frame relay and Switched Multimegabit Data Service.

The product is DEC's second access router, joining the existing DECwanrouter 90. That product supports only the Integrated IS-IS routing protocol, DECnet Phase IV, DECnet/OSI and IP network protocols as well as a 64K bit/sec wide-area link.

According to Charles Robbins, director of communications research at Aberdeen Group, Inc. in Boston, the product's strengths are the array of routing and network protocols it supports and its aggressive pricing. It costs from $3,240 to $4,350.

The DECbrouter 90 will be available next month.

✆DEC: (800) 344-4825.

NCR manager supports Remedy

Application can be integrated with StarSentry.

BY JIM DUFFY

Dayton, Ohio

NCR Corp. last week said users of its StarSentry network and systems management product can now use a popular help desk and automated trouble-ticketing system from Remedy Corp.

NCR developed software that allows Remedy's Action Request System to be integrated with StarSentry. The software, which runs on the same Unix-based NCR 3000 platform as StarSentry and the Remedy trouble-ticketing system, allows StarSentry to automatically generate trouble tickets based on predefined event thresholds or traps.

IN ON THE ACTION

Remedy's Action Request System is an application that automates the process of generating trouble tickets.

Trouble tickets include the name and address of the affected network device, its conditional status and other information pertinent to initiating remedial action.

"In a sense, we've got a higher level of automated operations," NCR's Hansch said.

Based on this information, trouble tickets can be routed to the appropriate network technician or programmed to signal the management system to generate automated, predefined reponses to certain network conditions.

''In a sense, we've got a higher level of automated operations,'' said Ed Hansch, NCR's StarSentry independent software vendor program director. ''It actually allows the generation of the trouble ticket without human intervention, so we feel that's pretty significant.''

Support for the Action Request System will allow StarSentry users to see an icon change color on their displays when a trouble ticket is generated. By clicking on that icon, system managers can view the trouble tickets, collect information about the affected device and then query the trouble ticket database to research how similar problems were resolved in the past.

Remedy's Action Request System is an application that automates the process of generating trouble tickets.

Any change in the status of the Remedy trouble ticket is automatically indicated by a change in the color of the StarSentry icon representing the device that generated the ticket.

Also, any modification of the trouble ticket — such as logging the most recent problem and remedial action — will automatically be logged in the Action Request System database.

Remedy's Action Request System can also generate trouble tickets for management systems from Chipcom Corp., Hewlett-Packard Co., Novell, Inc., Sun Microsystems, Inc., SynOptics Communications, Inc., 3Com Corp. and Wellfleet Communications, Inc.

The software module, which has not yet been named, will be available next month. The Action Request System for the NCR 3000 platform will also be available at that time for a base list price of $6,500.

✆NCR: (513) 445-5000; Remedy: (415) 903-5200.

Standards

Continued from page 13

review, and after at least two interoperating implementations of the standard have been produced — if it is a protocol or application standard — the document can be considered for elevation to full standard status.

As you might expect, there is also an appeals process for anyone who is unhappy with the results.

These standards are concerned with more than just TCP/IP protocols. Standards exist or are under way for a number of other protocols and even operating procedures. The standards process itself is the subject of an RFC.

To my mind, there is easily enough structure and procedure to preclude wayward drifts in the process and to ensure a full and open review of any proposed standard.

Now I may be a bit biased. I've been attending IETF meetings for a while, I chaired a working group, I am an IESG area director and I'm now an ISOC trustee. But, sure, I would air the dirty laundry if there were some.

As I said last time, there are many types of standards; RFCs are among the legitimate ones.

PS: Some of the words in this column are taken from various ISOC, IAB and IETF documents because they are worded better than I can write.

PPS: Exercise for the reader: Do you think, given sufficient resources, you could design an airport as inefficient as Dulles?

✏ Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

BRIEFS

Continued from page 11

CrossComm Corp. last week announced a new venture with TRICOM, a London-based personal computer connectivity supplier, that is designed to allow the vendor to significantly boost its presence in the U.K.'s IBM internetworking market.

CrossComm will own 51% of the new company, called CrossComm UK, and TRICOM will own 49%.

Newbridge Networks, Inc. has been awarded a contract by Kansas City Power & Light Co. (KCP&L) to supply the utilities company with intelligent digital networking equipment for the expansion of KCP&L's fiber-optic and microwave-based digital network.

Newbridge will install its 3600 MainStreet Bandwidth Manager, 3645 MainStreet High Capacity Bandwidth Manager and 4602 MainStreet Intelligent NetworkStation throughout western Missouri and eastern Kansas.

Newbridge: (703) 834-3600.

WilTel Data Network Services has announced a nationwide distribution agreement with **Cascade Communications Corp.** under which WilTel will resell Cascade's entire line of frame relay and Asynchronous Transfer Mode switches as part of its net integration business.

Integration

Continued from page 11

Mass.; and Navin Jain, general manager of network management at Novell, Inc. in Provo, Utah.

INTEGRATION

The roundtable concluded that management application integration can be achieved in three ways.

The first and most widely recognized means is to give applications access to management data using various protocols, such as the Simple Network Management Protocol and the Common Management Information Protocol.

But users say this method fosters protocol dependency, meaning applications developed to work with one protocol cannot work with those developed for another.

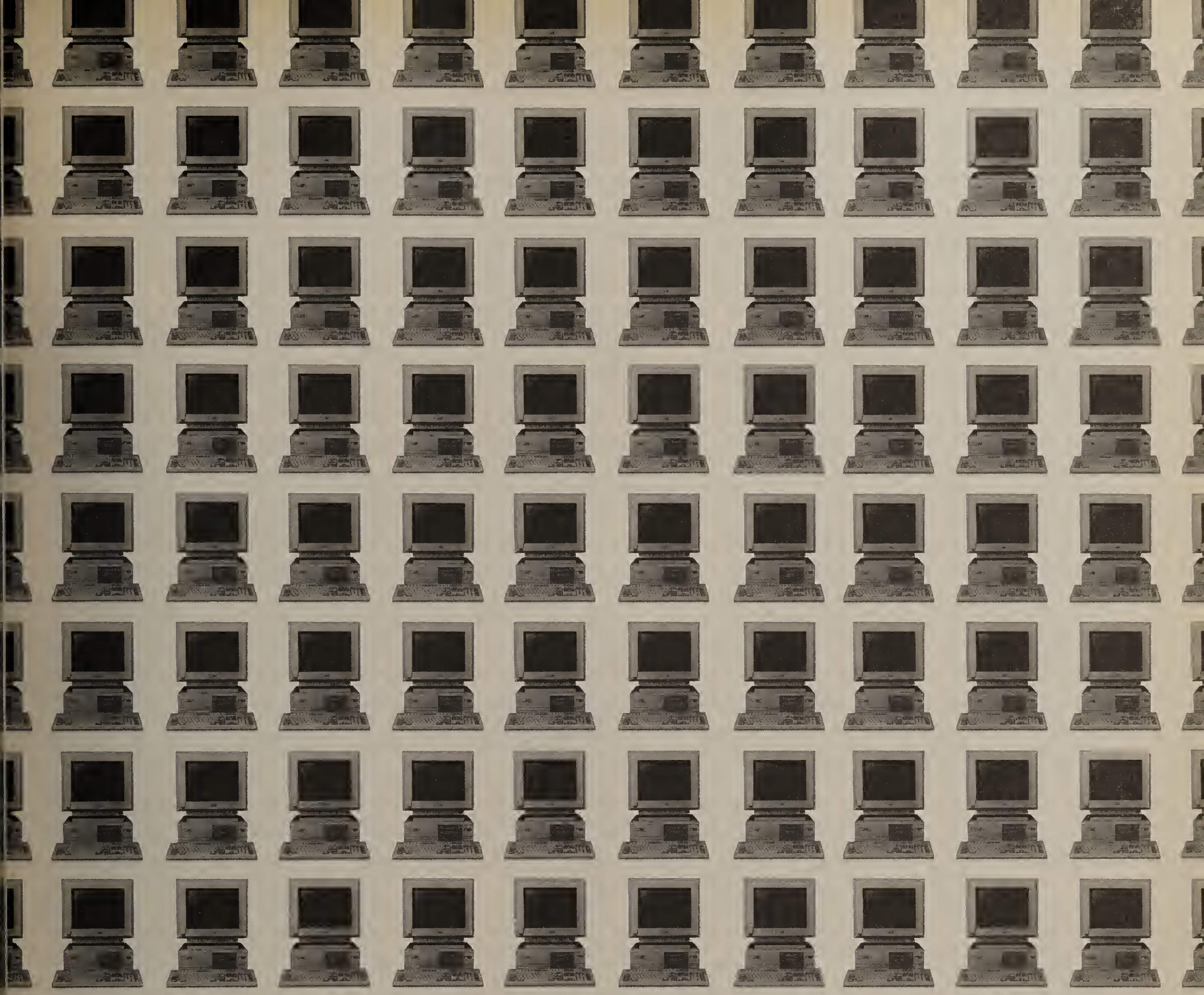
"In our environment, we need the ability to implement management systems that make the underlying protocols transparent,'' said Charles Schwab's Gil. "We need a single system image, similar to what we have on the mainframe now.''

The second aspect of management integration is the ability for two or more applications to share the same data. For example, a topography management application may model a workstation as a node in a wiring diagram, while a trouble-ticket application could model the same workstation as an item in its inventory database.

If the workstation is removed from the network, both applications need to find out and act on that new information. Ideally, they will do so using common data to limit the risk of duplication.

Having all applications use a common database is one way to achieve this type of integration. But

See Integration, *page 18*



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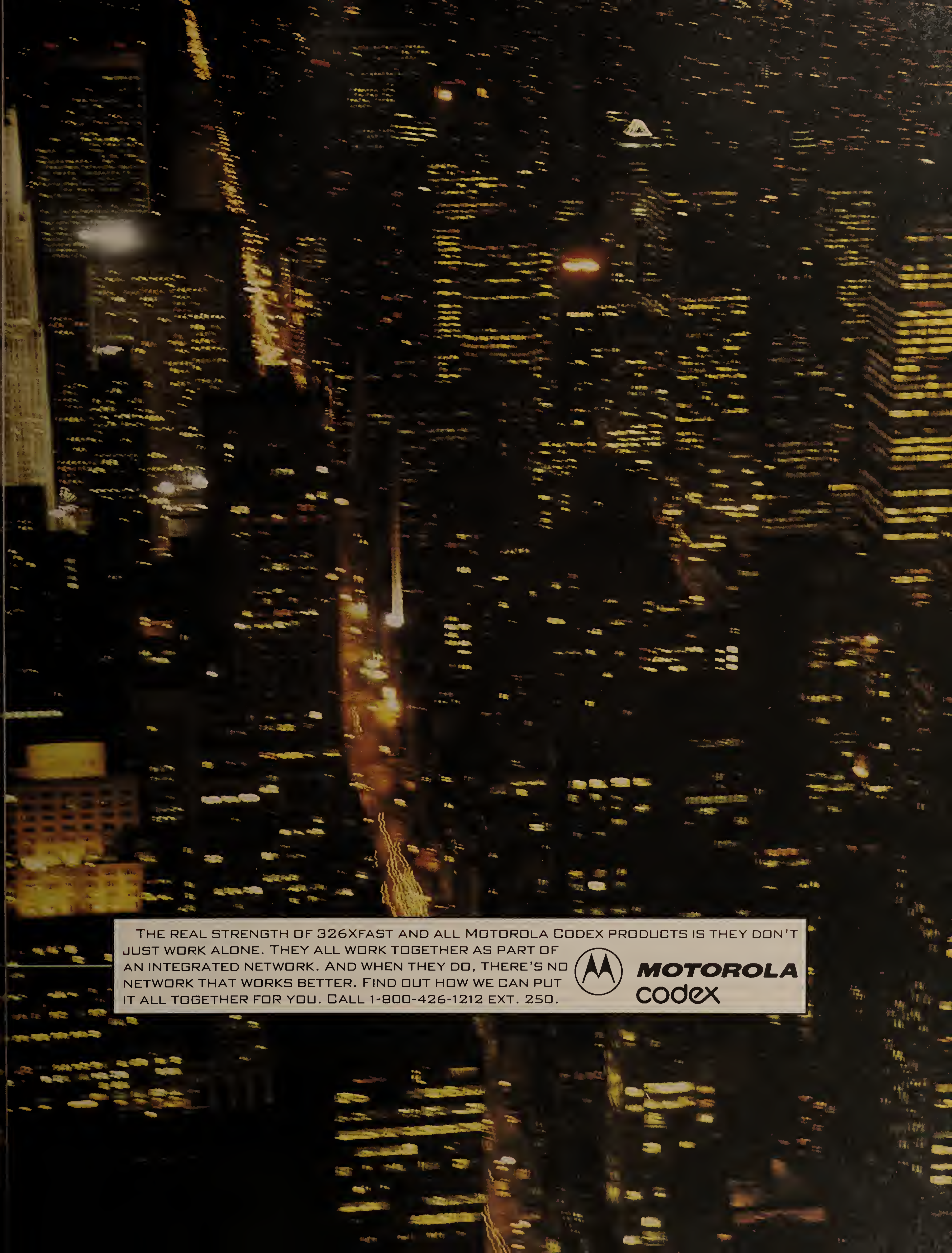

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Integration

Continued from page 14

this option isn't practical. No vendor has successfully defined a model that supports all management applications today and in the future.

The third aspect of management application integration is the ability of one application to call upon another to perform a specified function. For example, a user might want to invoke a diagnostics application for a class of devices, such as modems, from within a trouble-ticketing application.

"We think of management integration as including both data integration and functional integration," said Loh of Banker's Trust.

INTEGRATION ACHIEVED

Vendors and users are proceeding with various efforts to integrate management applications. Software vendors are creating gateways between their products. The result is better integration but only between certain application pairs and trios.

Platform vendors are defining policies and procedures to promote use of their underlying facilities for application integration. These efforts are specific to management platforms such as HP's OpenView for Unix and the Tivoli Management Environment.

The Common Object Request Broker Architecture (CORBA) from the Object Management Group of Framingham, Mass., is a standard interface to object management services that could address management application integration.

CORBA's most important contribution would be to allow one application to invoke a function in another application.

The Network Management Forum, OSF and others are working through a self-appointed task force called the Hilton Head Object Group (HHOG) to define a comprehensive set of common object definitions for management applications. This effort is seeking to define a cross-platform information model for network and systems management applications.

HHOG's search for consensus on common management object definitions has spanned three years to date and will require many more. However, the industry is making real progress toward meeting the integration requirements of users.

Of all vendors involved in network and systems management, independent software vendors (ISV) are the closest to customers, and they are feeling heavy pressure from users to integrate their applications with one another. However, no ISV by itself possesses the market clout to set standards for management application integration.

Networx's Slatt describes the paradoxical situation ISVs are in: "We see integration as involving not only today's information about network devices, but also information about logical resources, like software. We'd love to have common naming services, object definitions and methods to use. But until these are available on management platforms, we must deliver application integration to our customers in more practical ways."

For Networx and other ISVs, there are three practical ways to promote tighter integration of applications, and all of them require working with other vendors.

The first is to allow applications to interact at the command-line interface level. For example, predefined scripts triggered by thresholds can automatically input commands and parameters at one application's command-line interface that will instruct it to retrieve data from another application or perform some operation.

This is a lowest common denominator option for application integration, but it works.

The second way for one ISV to integrate its application with another ISV is through application program interfaces (API). APIs provide a set of function calls that an external program can use to gain access to data and operations within an application.

Most application vendors either already publish APIs or are planning to do so in the near future. However, this is a recent development in the industry and is not yet widely used for application integration.

The third method available to ISVs is to use a common data store for management information. SQL is the most accessible standard for ISVs, and so it is most widely used. Applications can use this interface to share access to a common database.

In all of the above three cases — the command-line approach, the API approach and the SQL approach — the integration method determines how robust and flexible the interaction can be.

The promise of integrated management is great, but the vision of modern network management will not be realized for users until there are powerful — if not standard — ways to integrate management applications.

➨Rymer is vice president of the Patricia Seybold Group, Inc. and editor in chief of the "Distributed Computing Monitor," a monthly analysis report. He is also chairman of the annual Patricia Seybold Marathon Week conference on distributed object computing and open systems.

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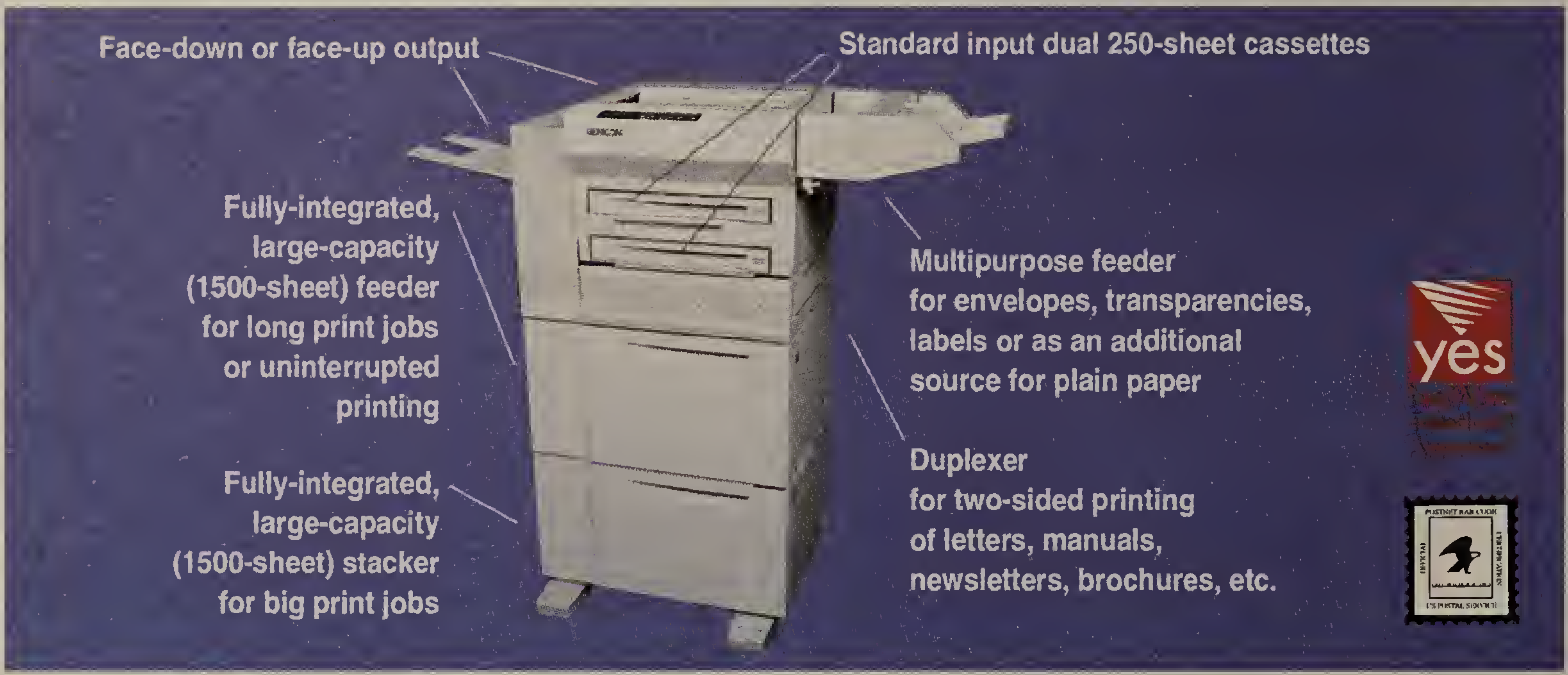
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Betting the farm on NT

Even before it ships, some users are already counting on Windows NT to transform their nets.

BY FREDRIC PAUL

At the introduction of Windows NT in Atlanta last May, Bill Bougourd, head of systems and technology for National Westminster Bank, stood before a packed house and boldly announced that NatWest would go where no company has gone before.

"We are redesigning our core business processes based on NT," proclaimed Bougourd, who sets technology directions for one of the U.K.'s largest banks. With that decision, NatWest stepped to the front of a small but growing band of companies that have committed to running mission-critical applications on Microsoft Corp's still-to-be released Windows NT.

Microsoft has shipped more than 65,000 beta copies, but the commercial version of the network-capable operating system will not be available until mid-summer at the earliest. Windows NT Advanced Server, which includes the operating system's more sophisticated network features, will follow at least a month behind the desktop version. SQL Server for NT, a critical component for many users, also will not ship until late in the year.

While the vast majority of NT beta users are content to test the waters, an impatient few are plunging in headfirst. They want to be among the first to take advantage of NT's scalability, reliability, multiprocessor support and price/performance for client/server applications.

Other NT backers

Company	NT plans
Chevron Canada	Moving order entry/pricing system from OS/2 to NT servers.
National Fuel Gas Supply Corp.	Building NT-based pipeline management and control system.
Nationwide Building Society	Downsizing customer service applications to NT servers.

SOURCE: MICROSOFT CORP., REDMOND, WASH. AND *NETWORK WORLD*

MAKE MINE SMP

For its part, NatWest plans to deploy a new NT/SQL Server-based work flow system, including document routing and tracking components, for its credit card, telemarketing and loan application operations. As soon as the commercial version of Windows NT Advanced Server ships, the bank will begin installing it on 40 to 50 NCR Corp. 3450 symmetrical multiprocessing (SMP) servers that support 1,500 clients running Windows for Workgroups.

The servers, which will handle application and file duties, will reside on 16M bit/sec token-ring local-area networks linked over the bank's wide-area network. Remote clients will also be supported with NT Remote Access Server (RAS). Rollout of this initial phase should be completed over the next year, Bougourd said.

Support for SMP servers was critical to NatWest's decision to use NT. "NT was architected from the ground up" to support SMP, Bougourd said. The bank also likes the fact that its developers will be able to integrate off-the-shelf software with custom applications. "Common [application program interfaces] on both the desktop and server" make that process easier. We're comfortable with Windows," he added.

But while NatWest is committed to NT as "the operating system of the future, we will continue using a variety of network operating systems," including OS/2 and Unix, according to Bougourd.

CORE BUSINESS SYSTEMS

Baxter Healthcare Corp., one of the nation's largest distributors of hospital prod-

See Windows NT, *page 21*

Firms team up for remote LAN access

BY FREDRIC PAUL

New York

Digital Communications Associates, Inc. and Citrix Systems, Inc. last week announced a strategic partnership to develop an integrated solution for high-performance remote access to local-area networks.

DCA, based in Alpharetta, Ga., also announced it has formed a Remote Access Division to focus on the remote LAN access market and announced a four-port version of its Remote LAN Node (RLN) product.

The technology and licensing partnership between DCA and Citrix calls for the integration of DCA's RLN with Citrix's WinView for Networks server system. RLN is protocol-independent client/server software that enables remote users to dial into LANs. The server portion runs on any popular network operating system and can manage up to 16 asynchronous access ports, while the client is used on remote nodes.

WinView for Networks, from Coral Springs, Fla.-based Citrix, is an application server that runs Windows applications and only forwards screen updates to remote users. This maximizes performance by minimizing data exchange over low-speed dial-up links and makes it possible for low-powered 286- and 386-based remote systems to run Windows.

Together, the two products give users the choice of remote-node or remote-control access to their LANs, depending on the type of application they are using.

RLN's remote-node approach "extends the network for client/server applications," said Ian Pennell, DCA's director of RLN products, "but it doesn't lend itself well to large file-intensive applications" such as databases. Combining RLN with WinView for Networks lets users run file-intensive applications on the Citrix box for higher performance, he added.

The combination has been tested at CBS News here with a menu and batch file implementation, Pennell said, but the vendors plan to develop seamless dynamic switching between the two approaches by early next year. "It's not like we have to start from scratch," Pennell said. DCA will market and sell the combined product.

The formation of DCA's Remote Access Division further cements the company's commitment to the "individual-centric remote computing model," Pennell said.

The new division, headed by DCA Vice President William Miller, will market RLN products for accessing corporate information, DCA's CrossTalk asynchronous communications software for contacting public information services and voice facsimile service products acquired last month from Alien Computing Corp. of Santa Barbara, Calif.

New products combining capabilities from these various categories should be available by early 1994, Pennell said.

DCA also introduced a four-port version of the RLN designed to offer smoother scalability between existing two- and eight-port versions. The four-port RLN will ship in 60 days for a list price of $2,250, he said.

☎DCA: (800) 348-3221. Citrix: (305) 775-0559.

BRIEFS

Codenoll Technology Corp. last week rolled out the CodeNet-9850 UTP/STP NuBus FDDI Adapter, which it claims is the first Fiber Distributed Data Interface adapter card for the Apple Computer, Inc. Macintosh that complies with the draft ANSI standard for running FDDI over unshielded or shielded twisted-pair wiring. The 9850 is a single-attached NuBus adapter that operates at distances of up to 100 meters on two pairs of any Category 5 data-grade cable and interoperates with any hub that supports the standard from vendors such as Digital Equipment Corp. and SynOptics Communications, Inc. Available now, the 9850 costs $1,795.

The company also slashed prices on some of its other FDDI products. Effective now, the price of the CodeNet-9540 FDDI PC AT LAN adapter has been reduced from $2,995 to $995; the CodeNet-9740 shielded twisted-pair adapter for FDDI has been lowered from $1,995 to $795; and the CodeNet-8391 10Base-FL Transceiver has been reduced to $295 from $395.

Codenoll: (914) 965-6300.

SynOptics Communications, Inc. last week continued to upgrade its management offerings with the introduction of SwitchMan, the latest LattisWare Solution management application. SwitchMan can be used to manage SynOptics' hub-based LattisNet 3328 Ethernet Switching Engine

See Briefs, *page 20*

HP ups performance on new 9000 servers

BY CARYN GILLOOLY

Palo Alto, Calif.

Hewlett-Packard Co. last week added six models to its HP 9000 Series 800 line of high-end Unix-based servers.

Three of the new models provide symmetric multiprocessing capabilities, which had not been previously offered in the line. The G70, H70 and I70 employ dual 96-MHz PA-7100 processors in a symmetric multiprocessing configuration that increases performance by more than 100%, HP said.

"According to TPC-A benchmark results, the new Model H70 delivers more performance with two processors than Sun [Microsystems, Inc.]'s new eight-processor SparcServer 1000 systems or NCR [Corp.]'s 3550, which is based on eight Intel [Corp.] processors," an HP statement said.

It went on to say that "The new Model H70s . . . outpaces the highest performing IBM RISC System/6000 Model 980 by more than two times at a price/performance advantage of 33%."

The other three models — the G60, H60 and I60 — use a single PA-7100 chip, although HP says these machines provide as much as a 40% performance increase over existing models in the 9000 line.

The G, H and I designations signify differences in the number of I/O slots, memory and disk storage.

The G60 and G70 each come with 32M bytes of memory, 500M bytes of disk storage and four HP-Precision Bus (PB) I/O slots. The products cost $50,000 and $76,000, respectively. The H60 and H70 come with 64M bytes of memory, 1G byte of storage and eight HP-PB I/O slots. These cost $83,000 and $109,000, respectively.

On the high end, the I60 and I70 machines come standard with 64M bytes of memory, 4G bytes of disk storage and 12 HP-PB I/O slots, and cost $108,000 and $129,500, respectively.

All models, expected to be available in September, will ship with the HP-UX operating system software preinstalled and configured.

For customers looking to upgrade existing machines rather than buy new machines, HP said it plans to let users change processor boards, backplanes or chassis. Further information is not yet available.

☎HP: (415) 857-1501.

Managing the process of managing the network

BY SKIP MACASKILL

If there is anything more important than the technology a company chooses for its corporate network, it would have to be finding the right people and resources to manage it.

That management task has become increasingly difficult over the past few years as networks have turned into complex jungles of mismatched technologies, standards and products.

But help is on the way. Members of the vendor-sponsored Certified Network Expert (CNX) organization — which offers a testing service that companies can use to evaluate personnel or potential hires — opened up registration for its first two exams.

And in a separate move, a group of users formed the Personal Computer Assets Management Institute, Inc. (PCAMI) with the mission to disseminate information about managing desktop systems.

In the CNX program, several vendors of analysis equipment — including The AG Group, Inc., Hewlett-Packard Co., Microtest, Inc., Network General Corp., ProTools, Inc. and Wandel & Goltermann Technologies, Inc. — worked together to create an examination that is both equipment- and vendor-independent.

"Our goal was to come up with an exam that is not tied to a specific training program, vendor, product or protocol," said Bill Tomeo, general manager of the Network Test Division at HP. "The exam deals with real hands-on troubleshooting situations that will accurately reflect an individual's readiness to handle the problems arising when managing today's networks."

According to PCAMI

The annual loss resulting from companies failing to:

- Track and monitor their desktop assets
- Plan for the allocation and replacement of those assets
- Realistically assess technical support requirements
- Devise configurations that meet business needs

Is around $20 billion.

PCAMI = Personal Computer Assets Management Institute, Inc.

The exam is administered through more than 220 Drake Testing and Technology Centers in the U.S. and Canada, with the initial offering of two exams — one for token ring and one for Ethernet. Other disciplines will be offered in the future.

The exam consists of 300 multiple-choice questions that have anywhere from four to eight responses.

The first exams cost $395 each. During the initial phases of the program, there will be an opportunity to retake a CNX test at no extra charge. A detailed pretest study guide with a sample test is available for $50.

For its part, the PCAMI hopes to help managers address a variety of desktop asset management problems that face most companies, including lack of accurate hardware and software inventories, problems with nonstandard configurations and the liability of software copyright infringement.

Essentially, the organization serves as an information "network" that net managers can tap into to exchange ideas, cull research and compile statistics, among other useful data, according to Timothy Poley, executive director of PCAMI.

Members of PCAMI, whether they are individuals or corporations, receive a quarterly newsletter dubbed the "PC Assets Management News," as well as a series of "Industry Focus Reports," which PCAMI will commission periodically on a host of topics.

The first report, "After the Revolution: The Crisis in Personal Computer Assets Management," is available now.

The PCAMI has also established an 800 support number that will function as a help desk for members trying to set up asset management programs. The group will also give members discounts on regional seminars addressing a variety of management subjects; access to a PCAMI electronic bulletin board; access to PCAMI's research library of surveys and reports; and a handbook for developing and implementing a PC assets management strategy. PCAMI will serve as a user advocate in the PC management industry and work closely with other groups such as the Desktop Management Task Force.

According to Poley, companies can give you the exact amount of miles that their sales force vehicle fleet has traveled, but they cannot tell you how many desktop systems they own. These technology resources are more critical to the business, represent a bigger investment overall and demand better management, he said.

Individuals may join for a special introductory annual membership fee of $295, which is good through Sept. 30, when the rate will increase to $395.

As many as 10 managers within a single organization may join under a special corporate membership plan that costs $2,000 annually. After Sept. 30, that rate will rise to $3,000 per year.

☎ CNX: (800) 269-3926; PCAMI: (800) 722-6487.

BRIEFS

Continued from page 19

module as well as stand-alone Ethernet switches from Kalpana, Inc.

The Simple Network Management Protocol-based SwitchMan consists of three components. SwitchView provides a logical view of the 3328's status and configuration, while MatrixView offers a real-time view of traffic passing through the packet switching engine that is the core of the 3328. DesignView allows the net manager to compile historical data from the network to simulate various switch configurations for determining optimal port assignments.

SwitchMan, which runs on a Unix-based Sun Microsystems, Inc. SPARCstation, will be available in 30 days and costs $2,995.

The six-port 3328, which is based on Kalpana's EtherSwitch technology, is available now following a six-month delay resulting from the addition of full-duplex Ethernet capabilities. It costs $4,200, or $700 per port.

SynOptics: (800) 776-6895.

3Com Corp. is bundling five of its LinkBuilder Flexible Media Stack (FMS) stackable hubs into one package that costs $3,595, bringing the cost of the 52-port configuration down to $69 per port. The package includes four unmanaged FMS hubs and one Simple Network Management Protocol-based FMS that can be used to manage the entire stack as one logical repeater.

The company is also packaging its LinkBuilder TP/12 12-port work group hub with its LinkWatch SNMP-based desktop management software for $595, giving work group users a managed environment at only $49 per port.

3Com: (800) 638-3266.

OFFICEVISION WORKGROUP

IBM enhances line of connectivity products

BY CHRISTINE BURNS

New York

IBM last week at PC Expo here introduced four applications designed to help companies that are wrestling to integrate host and local-area network office environments.

The products build on the company's Current-OfficeVision Workgroup family, a suite of office automation and connectivity products designed to integrate VM and MVS mainframes with Application System/400 and LAN environments.

Each new application runs above IBM's OS/2 operating system.

"These products let customers integrate their office functions across whatever platforms they want," said Dick Sullivan, director of IBM's office and publishing marketing. "They provide application functions at the desktop or workstation level and provide for a migration to whatever enterprise level they want."

Time and Place Connectivity/2 is a 32-bit LAN-based application that allows users of IBM's Time and Place/2 work group scheduling product and OfficeVision/VM to view one another's calenders in their native environment and perform free-time searches across both calenders.

Time and Place/2, announced last March, is an OS/2 application that will also run under Microsoft Windows. Sullivan said IBM is planning to offer Time and Place Connectivity/2 links for MVS mainframe and AS/400 environments in the near future.

Address Book Synchronization/2 is a new 32-bit application that supplies a set of LAN and host administration programs for synchronizing VM CallUp, the directory service on OfficeVision/VM, with Lotus Notes and cc:Mail directories.

"Address Book Synchronization allows users to access updated directory information without having to do the actual updating themselves," Sullivan said.

The software uses Advanced Peer-to-Peer Communications protocols to extract VM-based information, transmit the data to a LAN and update Lotus Notes or cc:Mail directories.

Search Manager/2 is a new LAN application with an object-oriented graphical user interface (GUI) that will ultimately make it possible to provide full text searches and retrieval solutions for integrated LAN/host environments.

The program allows users to conduct "linguistically fuzzy" searches and then index, search and browse a variety of documents including those written in ASCII, AMIPro, Lotus Notes, Microsoft Word and WordPerfect for the desired phrase or topic.

As announced, Search Manager/2 only provides text searches across IBM LAN Server-based LANs. IBM has an existing product, Search Manager/370, for IBM 390 environments.

Users will be able to download host files to the LAN for searches, but a single search across LAN/host environments will not be possible until a supplemental release of Search Manager/2 is available.

Used alone or with Search Manager/2, the new Thesaurus Management System is an on-line, object-oriented thesaurus that can be employed to search for synonym-related information.

This application can also search for words or phrases with other types of relations such as hierarchical (wheel is part of a car), associative (dog is associated with pets) and user-defined relations.

All four products are currently in beta and have not been priced yet.

EARLY ARRIVALS

In addition to the new products, IBM announced the early arrival of three office integration products that were not scheduled to ship until the end of this summer: Mail LAN Gateway/2, Current-OfficeVision/2 and Electronic Forms Management System/VM Version 2 Release 1 are available now.

Current-OfficeVision/400 is a Windows-based client/server application that provides personal computer users with a GUI to OfficeVision/400-based information.

Because the same GUI is already offered with the other members of the Current-Workgroup family — OfficeVision/VM and Current-OfficeVision/VMS — office workers can now have the same look and feel across IBM's host and mid-range OfficeVision products.

The price of Current-OfficeVision/400 is based on the size of the AS/400 processor, ranging from $1,500 for the 9402 processor to $50,000 for the 9406.

The new Mail LAN Gateway/2 offering — which is software that sits on the LAN and handles conversions associated with the integration of host- and LAN-based electronic mail platforms — has been expanded to support Lotus Notes.

Previously, the product supported only cc:Mail, OfficeVision/400, the IBM Information Network Mail Exchange, DISOSS, OfficeVision/MVS via DISOSS and Office Path/Systems Network Architecture Distribution Services.

Mail LAN Gateway/2 costs $2,000 for 10 users and $10,000 for 100-plus users.

☎ IBM: (800) 426-2255.

MACTIVITY '93

Vendors showcase Mac connectivity options

BY FREDRIC PAUL

San Jose, Calif.

Novell, Inc.'s release of NetWare 4.0 for Macintosh headlined a long list of product introductions at Mactivity '93: The Macintosh Connectivity Conference here last week.

But Novell was only one of more than 100 vendors and thousands of network managers that attended the show, reaffirming that the Macintosh has earned a place in enterprise networks.

In addition to NetWare 4.0 for Macintosh and AppleTalk routing announcements from several vendors (*NW*, June 28, page 4), products spanned the network spectrum from routers to network file-sharing wares to token-ring integration offerings.

Novell said the new Macintosh version of NetWare 4.0 will support as many as 1,000 users on a NetWare server. NetWare for Macintosh 4.0 offers Macintosh access to NetWare directory services through bindery emulation, DOS file extension mapping, which is the ability for other clients to read Macintosh-based CDROMs through a NetWare server, enhanced print services, and optional AppleTalk routing and support for Fiber Distributed Data Interface cabling.

The company will also release NetWare for Macintosh Client 1.0 software, a Macintosh-based utility for managing the user environment in NetWare 3.11 and 4.0. Available later this month, NetWare for Macintosh 4.0 costs $1,195, including the new client software. A five-user version will be included in the next release of NetWare 4.0

NetSpan Corp. of Richardson, Texas, introduced a new line of routers based on a communications processor and a pair of "personality" modules. The MultiRouter family uses these plug-in personality modules to provide flexibility and upgrade options. Compatible with all leading AppleTalk products, the MultiRouter products support Ethernet, LocalTalk, V.32bis modems and serial connections.

The MultiRouters do not currently support AppleTalk tunneling through Transmission Control Protocol/Internet Protocol nets, but future versions will support whatever AppleTalk routing and tunneling standards emerge from Apple Computer, Inc. and the AppleTalk Networking Forum. The routers are available now, with prices ranging from $1,495 to $2,295, depending on configuration.

Intercon Systems Corp., based in Herndon, Va., introduced Version 1.3 of its NFS/Share Network File System client software for the Macintosh. The new release provides new connectivity features, more comprehensive sharing information and increased distributed computing performance.

Based on Sun Microsystems, Inc.'s Open Network Computing/Network File System (ONC/NFS), NFS/Share offers seamless access to NFS-supported services, including Unix files. Shipping now, Version 1.3 costs $295 per node. It now interoperates with the Macintosh's built-in Personal File Sharing system.

White Pine Software, Inc., based in Nashua, N.H., announced Mac300 Version 1.2. The new version of the terminal-emulation software adds more than 30 new emulation features and file-transfer enhancements, including support for more file types for mobile users and on-line help for nontechnical users. It also includes better memory management, error handling and color printing capabilities.

Companies introducing products at Mactivity '93

CE Software, Inc.	(515) 224-1995
Dayna Communications, Inc.	(801) 269-7394
Intercon Systems Corp.	(703) 709-5500
NetSpan Corp.	(214) 690-8844
StarNine Technologies, Inc.	(510) 649-4949
Technology Works, Inc.	(512) 794-8533
White Pine Software, Inc.	(603) 886-9050

Available now, prices range from $99 to $349, depending on configuration, with a $50 upgrade cost.

CE Software, Inc. in West Des Moines, Iowa, announced Cross-Platform QuickMail MHS, which delivers Macintosh and Windows messaging clients native to Novell's NetWare Message Handling Service (NetWare MHS). Available now, the new product includes graphical user interfaces that let users attached as many as 60 files to each message. Network administrators can use it to set and modify directory privileges. Available now, QuickMail MHS costs $599 for 10 users, $1,399 for 25 users and $4,499 for 100 users.

StarNine Technologies, Inc. of Berkeley, Calif., announced a new version of its Mail*Link Directory Services with a new Find interface for CE Software's QuickMail. The interface, called Mail*Link DS Find, offers greater flexibility and information searching options. DS Find will be included free in Version 1.5 of Mail*Link Directory Services, scheduled to ship this summer for $2,995 per server bundle.

Dayna Communications, Inc. in Salt Lake City announced TokenPrint and TokenPrint Plus, LocalTalk-to-token ring bridges designed to connect LocalTalk printers and other devices directly to token-ring local-area networks.

The products support all LocalTalk devices except routers, including printers, network modems and all types of Macintoshes. Available next week, TokenPrint connects two devices for $699, while the $899 TokenPrint Plus connects as many as four devices.

Technology Works, Inc., based in Austin, Texas, announced GraceLAN Network Manager 3.0, which adds the ability to store the network-device data it gathers and to set up custom views for scanning the network. The new version is also protocol- and platform-independent.

Available next week, GraceLAN 3.0 will cost $795 per network administrator. Existing customers can upgrade for $149. The company also announced that it has begun shipping GraceLAN Server Manager 2.0, which lets administrators remotely monitor and control AppleShare servers.

Windows NT

Continued from page 19

ucts, was already committed to client/server computing and was searching for the right platform for a distributed warehouse management and control system — a vital application for the business.

Initially, said Don Schoen, manager of distribution operating systems, Baxter will install an NT-based warehouse management and control package developed by MIDAK International in Tucson, Ariz. The application will run on a pair of Compaq Computer Corp. ProSignia servers in each of 50 distribution locations.

By the end of next year, however, Baxter plans to transition all of its several hundred LANs around the country from OS/2 LAN Manager to Windows NT. "We will attach NT application servers onto those LANs and will eventually convert those LANs [entirely] to NT servers," he said.

"This is a strategic application — the first that does real on-line transaction processing on a LAN at Baxter," Schoen said. "We weren't prepared to do that with [our] OS/2 LAN Manager networks. In general, if [an application] had any transaction processing content, it would absolutely have been done on the mainframe or a minicomputer."

Schoen said the company was impressed with NT's remote server support, its close integration with SQL Server, multidomain administration features and compatibility with the company's existing LANs. "[NT] seemed to be the product taking LAN-based computing from an era of work group computing to readiness for mission-critical applications," he added.

MOVING FROM OS/2

Exabyte Corp., a $287 million manufacturer of tape drives, plans to move its SQL Server-based quality control and analysis system from OS/2 to NT. Once NT passes Exabyte's interoperability tests, which will examine its Transmission Control Protocol/Internet Protocol and Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) capabilities, Exabyte will port the NT application to a new SMP WinServer 1500 from Sequent Computer Systems, Inc. supporting more than 20 clients.

Exabyte will set up the NT server at its Boulder, Colo., headquarters and test it running in parallel with the OS/2 version. Before switching to NT, Exabyte "will run simultaneous queries to get an apples-to-apples comparison," said Brian Dillman, manager of information systems at the company.

"We are truly anxious to get into the capabilities on NT," he said. But while the NT beta version has been extremely reliable, Exabyte "will not put NT in production in any type of beta release." The OS/2 version will remain live until the commercial release of NT. The OS/2 version will then serve as a backup to NT.

"This is only the tip of the iceberg" of Exabyte's plans for NT, Dillman said. The company has several other OS/2 applications, including quality control systems for other Exabyte products, service and support operations, that are bumping up against the limits of their personal computer-based hardware. NT's scalability and true SMP support give it the ability to handle these demanding applications.

"There are no sacred cows with changing technology," Dillman said, but Exabyte has no intentions of making the change to NT across its entire network. "We'd rather pick and choose whatever is appropriate."

NT CALLING

JCPenney Company, Inc.'s Catalog Telemarketing operation, which handles about 70 million calls a year, has used both Unix and Windows versions of AT&T's Accumaster Services Personal Computer (ASPC) software to manage rerouting of 800 calls among call centers. The company now hopes to take advantage of a new NT version of ASPC that combines the 32-bit power of Unix with the user-friendly Windows interface.

JCPenney plans to run ASPC on Windows NT as long as the final release performs as expected, said Patrick Rowe, network manager for JCPenney Catalog Telemarketing in Brookfield, Wis. JCPenney likes NT's scalability and the price/performance advantages of NT on PCs rather than Unix on workstations.

Rowe said, "My users already know Windows, so it's not like I have to take my users out and shoot them to retrain them."

Got a problem?

NETWORK WORLD'S R.A.F. READER ADVOCACY FORCE

Having trouble with a product or service? Call *NW*'s Reader Advocacy Force Hotline at (800) 622-1108. Ext. 487 or access the R.A.F. Forum on our BBS (see page 2). On the Internet? Contact nwraf@world.std.com.

Novell sets its sights on multimedia firm

BY CARYN GILLOOLY

Natick, Mass.

Novell, Inc. executives last week confirmed that the company is angling to buy Fluent, Inc., a firm that provides multimedia capabilities for NetWare environments.

Fluent, based here, sells a NetWare Loadable Module (NLM) that makes it possible to store compressed digital video and audio files on a NetWare server or on a dedicated multimedia server connected to the NetWare local-area network. With client-side software, users can play back that information using applications based on Microsoft Corp.'s Video for Windows.

The combined client software and NLM, called FluentLinks 2.0, work to establish sessions between a client and a server. Once established, FluentLinks uses scalable video technology to vary the video bandwidth during playback, depending on the current status of the network and server and client throughput.

FluentLinks comes with a control panel displaying current network activity and individual session statistics to help administrators manage application performance. With the purchase, Novell will offer these multimedia services as a part of NetWare.

"Multimedia capabilities are fundamental to extending networks," said Robert Young, director of NetWare products marketing for Novell's NetWare Systems Group in Provo, Utah. Further information about the purchase was unavailable.

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ATM Forum finalizes spec for equipment interoperability

Will accelerate service deployment and acceptance by users.

BY BOB WALLACE

Westford, Mass.

The ATM Forum's technical subcommittee has finalized a document that specifies how users' customer premises equipment and carrier network switches will be able to interoperate in ATM networks.

The User-to-Network Interface (UNI) specification will initially describe how devices such as hubs and routers can establish fiber-optic and, later, copper links to local and long-haul carriers' planned Asynchronous Transfer Mode net services.

The UNI, which will be supported by equipment vendors primarily through new software, also delineates how vendors should support features such as switched virtual circuits (SVC) and multicasting in their ATM products.

"The finalization of the UNI is an essential step on the road toward ATM services," said Chris Finn, a senior analyst at TeleChoice, Inc., a Verona, N.J., consultancy. "It's a signal that ATM services are ready to debut."

The UNI specification is meant to address the issue of interoperability between ATM products and services, which was cited in a poll by users as the top barrier to implementation of ATM during the next three years.

The survey was prepared by McQuillan Consulting for the ATM Forum, a Cambridge, Mass.-based consulting and research firm. The company interviewed network managers at many firms, such as Amoco Corp., Bankers Trust Co., Boeing Computer Services, Digital Equipment Corp. and Texas Instruments, Inc.

Another key user concern is whether users can employ an existing cable plant in ATM nets.

A special forum subcommittee is working toward including unshielded twisted-pair wiring in the UNI specification — a move that could possibly make ATM less costly for users and, therefore, much more attractive.

"There's a ton of UTP out there today," said Steve Walters, vice president of the forum's committee management group. "It'd be a very attractive and inexpensive way to use ATM."

Added TeleChoice's Finn, "UTP may be able to do for ATM what it did for Ethernet."

Vendors pitch ATM over copper to ATM Forum

Speed	Contributors
25M bit/sec	Chipcom Corp., IBM
52M bit/sec	AT&T, IBM, Silicon Systems, Inc.

SOURCE: ATM FORUM, MOUNTAIN VIEW, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

In addition to laying out the process for building ATM networks, the forum's UNI document explains the signaling procedure that devices need to support before they can interoperate.

"The signaling protocol would enable customer premises equipment, like a workstation, to set up and negotiate the parameters of a connection with a carrier network," Walters said.

The UNI specification also delineates how to support SVCs. SVCs will enable users to communicate with sites that cannot justify a permanent virtual circuit, which is essentially a private line, said Glenn Estes, chairman of the ATM Forum's technical committee.

See ATM Forum, *page 25*

BRIEFS

US West Advanced Communications Services has released sales and revenue figures for its public frame relay service, which is available in 18 metropolitan areas and statewide in three of the 14 states that comprise its territory.

As of June 1, the company had 32 frame relay contracts representing some 600 access ports. It expects to have closed 90 more contracts representing 1,500 more ports by year end.

The existing contracts are generating more than $5.8 million per year. The planned contracts would bump that figure up to more than $20 million.

For some networks, frame relay costs users up to 30% less than equivalent leased-line solutions. In addition, US West Advanced Communications is preparing to file for price reductions of as much as 40% for high-speed network users.

USA Video Corp. and **ADC Telecommunications Inc.** have signed a preliminary technology agreement to pursue the development of systems that carriers and cable television firms can use to deliver high-speed interactive services to residential users.

To support the services, the companies intend to integrate ADC's Homeworx access platform, which is located near neighborhoods, with USA Video's server and digital video receiver.

The services could include pay per view, videoconferencing, cable television transport, interactive multimedia, document and image transfer, home shopping and library access.

The first customer for the end-to-end video-on-demand system is Rochester Telephone Corp., which has announced a field test to begin this fall involving more than 100 homes in Rochester, N.Y.

The company says it plans to expand the service next year, after the field test results are evaluated.

AT&T launches int'l facsimile service

BY BOB WALLACE

Basking Ridge, N.J.

AT&T last week announced an international facsimile service that uses reserved circuits and a new monitoring system to boost quality and reliability.

AT&T said its new International Advanced FAX Service eliminates common transmission problems such as missing lines of text and incomplete messages by using specially designated, digital international circuits and a tool called the FAXalyzer System to monitor the quality of the links.

Richard Bush, marketing director for AT&T's Business Communications Services unit, said the service can save users time, money and even increase business opportunities by helping ensure that fax images are legible and are not interrupted before they are completed.

The service is available for faxing between the continental U.S., Hawaii and the Philippines. The Philippine Long Distance Telephone Co. will exclusively market the service in the Philippines as FAX Access Service. AT&T plans to extend the service to more countries but declined to identify them.

International Advanced FAX Service will be jointly offered under bilateral agreements between AT&T and a telecommunications company in each participating country. No special telephone lines are required.

Until Jan. 1, 1994, charges for the service will be the same as customers pay for their existing service.

At that time, AT&T plans to file a tariff under which users would pay 22 cents for each six seconds, with a minimum of 30 seconds for calls made between 5 p.m. and 2 a.m.

Users would pay 18 cents per six-second increment with the same minimum for calls made between 2 a.m. and 5 p.m.

The service can be accessed from existing AT&T services, including Pro WATS, CustomNet, Megacom and Global Software-Defined Network services. To employ the service when dialing the Philippines, users simply insert a zero between the country and city codes.

The FAXalyzer System is a package of proprietary, software-controlled monitoring and diagnostic tools.

The system nonintrusively monitors the performance of the lines reserved for International Advanced FAX Service to ensure that they consistently function at a high-quality level.

Users who do experience a fax transmission problem can report it to AT&T's fax service center any time by calling (800) 329-4685.

☎ AT&T: (800) 222-0900.

CBEMA tries to derail property rights policy

BY ELLEN MESSMER

Washington, D.C.

Calling Europe's new intellectual property rights policy for telecommunications equipment "unfair and unreasonable," the Computer Business and Equipment Manufacturers Association (CBEMA) has asked the European parliament to block the rules.

CBEMA asked commissioners in the Brussels, Belgium-based European parliament to take action to suspend the European Telecommunications Standards Institute (ETSI) policy. That policy requires companies to sign away fundamental rights to telecommunications technology if they want to see it implemented in European standards. CBEMA asserts that the ETSI policy violates Europe's own laws on fair competition.

CBEMA also wants the parliament, called the Commission of the European Communities, to stop ETSI from expelling members that refuse to sign the policy. Apple Computer, Inc., Digital Equipment Corp., IBM and Motorola, Inc., all members of ETSI, have refused to sign the agreement, sources at CBEMA said.

Expulsion from CBEMA would effectively eliminate a company's chance to participate in setting telecommunications standards for Europe. The ETSI standards are often made mandatory government purchasing requirements by the European Commission.

The ETSI policy is unfair because it requires a company to notify ETSI if it does not want its technology considered as a standard within 180 days after ETSI issues a work order for a new standard, CBEMA said.

Companies failing to notify ETSI would cede the right to the technology to ETSI, which has set itself up as the final arbitrator on licensing matters, eliminating the role of the courts.

"ETSI plans to expel members that do not sign this blank check," said John

See CBEMA, *page 25*

Mobile nets: strings attached

BY CHARLES BRUNO

Dallas

Users attending the 1993 Mobile Computing Forum here late last month literally came to grips with the issues of wireless communications.

Packing palmtop personal computers issued on a trial basis by Hewlett-Packard Co., attendees tinkered with wireless electronic mail, messaging one another over nationwide radio nets provided by ARDIS Co. and RAM Mobile Data, Inc., as well as forwarding mail via the Internet to associates and Vice President Al Gore.

Hopes for wireless technology soared as users sampled radio-based E-mail, but the harsh realities of unresolved technical issues and application development considerations brought attendees' expectations back down to earth.

"I came here with the hope of finding some answers about the types of [wireless] products and services best suited for my company," said David Stephens, information systems manager at Energy Industries, Inc., a Corpus Christi, Texas, maker of compressors for the natural gas industry. "But it seems like I'm going to leave with more questions than answers."

One common theme hammered home by several vendors, including AT&T, was the concept of wireless services that give users access to data "anytime, anywhere." But some attendees just didn't believe the pitch.

"When people talk about 'anytime, anywhere' wireless computing, they are either naive or hold a degree in marketing. It just isn't possible today," said Alan Reiter, editor of "Mobile Data Report," an Alexandria, Va., newsletter.

With regard to ARDIS and RAM Mobile Data, the two largest mobile data service providers, Reiter said ARDIS provides good packet data radio transmission coverage nationwide, has superior signal penetration into buildings and has a "big-iron mentality" that helps it understand the needs of large user shops. On the downside, he said ARDIS does not support voice transmission and lacks full automatic roaming across its network.

The ARDIS net:
- *** Covers 400 major areas.**
- *** Reaches 80% of the U.S. population.**
- *** Serves 70 corporate customers.**
- *** Includes 1,300 transmitters.**
- *** Boasts 917 base stations supporting roaming.**
- *** Handles 43 million messages per month.**

ARDIS is working to correct the roaming deficiency, said Tom Berger, vice president of radio network and product technology at ARDIS. As for the lack of voice support, he said the ARDIS network is not engineered to support voice traffic.

RAM Mobile Data, meanwhile, provides good nationwide coverage but offers mediocre signal penetration into buildings due to its radio signaling technology, according to Reiter.

CELLULAR COMES ON

Radio-based service providers won't be the only game in town for long. Throughout the 2-day conference, which was sponsored by Dataquest, Inc., speakers alluded to the imminent arrival of cellular digital packet data (CDPD).

Driven by a group formed in May of last year, CDPD will support data transfer at 19.2K bit/sec and offer throughput of 11K bit/sec. But unlike radio nets, CDPD services will make it possible to support voice and data due to a channel-hopping technology that allows providers to stuff data bits in the empty spaces between voice traffic.

"And as data traffic needs grow, we can dedicate whole channels for data only," said Jeff Brown, vice president of sales and marketing for McCaw Cellular Communications, Inc.'s Wireless Data Division. Another plus for CDPD services is that they will support such standards as the Transmission Control Protocol/Internet Protocol.

Since the inception of CDPD, service providers, led by McCaw, have set aggressive rollout schedules for services based on the technology. Originally, the specification was expected to be complete last January, but that date was postponed until this month. Services will follow shortly.

See **Mobile**, *page 25*

FCC considers waiving per-call AT&T price caps

BY BILL BURCH

Washington, D.C.

Price caps on AT&T services have worked for the past four years and should remain in place, the Federal Communications Commission said recently. But the commission noted that it would consider eliminating the caps on per-call long-distance service for business users.

The FCC imposed the price caps in 1989 to hold down consumer prices while encouraging the carrier to cut costs and increase profits. In evaluating the success of the plan, the FCC Common Carrier Bureau reported that the caps have promoted rate reductions, infrastructure upgrades, the introduction of new services and a substantial rate of return for the company.

But the bureau does want some small changes, and the commission approved a notice of proposed rule making for the changes. The bureau said competition in optional calling plans, such as AT&T's iPlan, have forced prices below the caps, thus proposing to remove the service from price caps.

The commission said it would consider AT&T's suggestions for separate regulation of residential and commercial per-call long-distance service, and lifting the caps on the business side. The FCC is also considering combining 800 directory assistance and other services into a single basket for averaging pricing.

Also, the bureau revealed that AT&T's service outages had been overstated due to a programming error. The carrier said it had corrected the error in January. Looking for solid figures on outages, the commission asked for an independent audit of the carrier's reports.

At the meeting, the commission broke new ground on regulating telephone companies as they enter new businesses. Commissioner Irvin Duggan broached the subject by asking if lower access pricing by competitive access providers would be passed along to users. Acting Bureau Chief Kathleen Levitz said such cuts weren't much of an issue because there is little switched interconnection for the alternative carriers at this point, but promised to look into the issue at the appropriate time.

Commissioner Andrew Barrett also queried Levitz on regulation of new telephone company ventures, asking her to follow closely the restructuring of some of the regional Bell holding companies.

PC CARDS

PCMCIA cards a boon to mobile nets

BY ELLEN MESSMER

The wave of Personal Computer Memory Card International Association (PCMCIA) cards now hitting the market will be a boon to mobile computing, but the industry has only started to ensure card interoperability for both wireless and wireline applications.

The credit card-sized integrated-circuit PCMCIA cards can support functions including wireline and radio-based facsimile and modem capabilities, mass storage and memory extension.

An industry effort to ensure that the PC cards can be swapped out across computer platforms is being spearheaded by Motorola, Inc. for radio-frequency uses.

"There's been a problem with people buying a card and assuming it will work across platforms," said Andy Prophet, president of the Cupertino, Calif.-based AP Research consultancy.

Prophet noted that salespeople often tout the interoperability of the PCMCIA cards — which is the goal of the PCMCIA standards — but the reality is that users have to check to be sure the cards will work in the laptops and mobile devices they expect to use.

There are now about 30 fax and modem PCMCIA cards, 10 mass-storage cards and about 300 PCMCIA memory cards, according to AP Research. In addition, of the 111 types of portable devices, such as laptops and pen-based computers, 56 now offer a PCMCIA slot.

There are three basic PCMCIA cards (see graphic, this page). The Type 1 specification, approved in 1990, is commonly used as a memory extender, while Type 2, approved in 1991, is expected to find widespread use in applications such as fax, modem, local-area network attachment and encryption processing. Type 3 can handle functions such as rotating storage media.

The three types of PCMCIA cards

Type	Card size (millimeters)	Storage (M bytes)
Type 1	3.1	10
Type 2*	5.0	20
Type 3	10.5	105

* Type 2 is expected to be implemented widely in pen-based products, notebooks and other mobile computing devices for fax, modem, LAN, encryption and other applications.

SOURCE: THE PERSONAL COMPUTER MEMORY CARD INTERNATIONAL ASSOCIATION, CUPERTINO, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

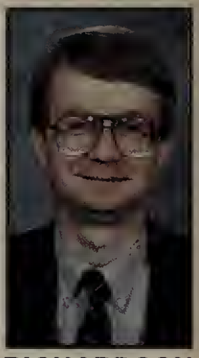
Motorola, which plans a rollout of several Type 2 PCMCIA cards for wireless data communications, last month spearheaded an industry effort to head off problems with PCMCIA cards used in radio-based applications.

Motorola's Paging and Wireless Data Group got a crowd of vendors to work to ensure the development of interoperable PCMCIA wireless-enabled products.

This effort is in addition to the work by the 350-member PCMCIA trade group, based in Cupertino, Calif. The group recently founded the Compliance Compatibility Testing Committee to find a method for assuring that products are PCMCIA-conformant.

"We're a member of the PCMCIA committee, but we found we needed an extra effort to get an activity established for a radio modem for PCMCIA cards," said Pat Richardson, vice president and general manager of the subscriber products division at Motorola's Paging and Wireless Data Group."

Motorola demonstrated Type 2 PCMCIA cards it plans to release in the next 18 months. The Type 2 intelligent wireless modems will have their own battery and antenna.


RICHARDSON

The modems will be able to alert the user to an incoming electronic mail message, which will be stored in the modem's internal memory. The user simply plugs the modem card into a mobile device to read the message. The modem cards can be easily removed, allowing use of the PCMCIA slot for other purposes, such as mass storage or memory extension.

Motorola plans to introduce the modem cards for ARDIS Co. and RAM Mobile Data, Inc. networks, as well as the cellular digital packet data networks set to debut this year. Motorola also demonstrated a wireline-based LAN modem card for its existing wireless LAN.

Expected to ship this summer, Motorola's NewsCard Advanced Information Receiver is a PCMCIA Type 2 card that lets users receive up to 128K bytes of E-mail, information services, files and paging messages. The NewsCard uses a single AAA battery, rather than drawing power from the host device.

Motorola throwing its weight behind radio-based PCMCIA interoperability is good news for users, analysts said.

By 1997, nearly 60% of all desktop, notebook and hand-held systems worldwide will support at least one PCMCIA interface slot, according to Gartner Group, Inc., a research and consulting firm based in Stamford, Conn. That amounts to an estimated 40 million systems.

Success in interoperability among all those cards will depend, at least in part, on vendors uniformly implementing in their operating software the PCMCIA Card and Socket Services 2.0 specification's application program interfaces released last fall, AP Research's Prophet noted.

ATM Forum

Continued from page 23

Equipment at each end of the link will use a special control channel to instruct switches in an ATM network when and where to establish SVCs. According to Estes, users will also be able to set up a multipoint SVC-like multicast that firms could use for a variety of data applications and videoconferencing.

Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy, said the specification also describes traffic management capabilities, including the ability for customer premises equipment to verify whether there is enough bandwidth for a requested ATM circuit before actually establishing the link.

The UNI is already winning industry support, with officials from companies including Adaptive Corp. and StrataCom, Inc. pledging to support the standard.

"If our equipment vendors give us what we need to support them, we'd begin offering them early next year once our ATM service is out," said Christine Heckart, marketing manager for broadband services at WilTel.

Separately, the forum's technical committee has hammered out a specification called the Inter-Carrier Interface, which delineates how local and long-haul carriers will be able to link their ATM network services.

"It's going to take a lot more than just a specification, but this is an important first step," said Tibor Schonfeld, division manager for InterSpan high-speed services at AT&T. ◼

Mobile

Continued from page 24

Even when the services become available, they will lack some sophisticated capabilities, such as advanced routing support and network management. In addition, users will have to sort through the plethora of hardware devices just now hitting the market.

HOMEWORK LACKING

Major vendors, including Apple Computer, Inc., AT&T, IBM and HP, mapped out plans at the conference for notebook and palmtop PCs, and teased attendees with glimpses of hand-held, pen-based personal data assistants (PDA).

As vendor upon vendor laid bare product plans, it became clear that few PC makers have developed the communications facilities needed to make such devices part of a networked computing infrastructure.

"We've seen a lot of PC vendors give their visions for these devices, and it's clear they haven't done their homework on the network side," said Bill Frezza, director of marketing and business development at Ericsson GE Mobile Communications, Inc.

Apple, however, did unfold a bare-bones plan, dubbed Client Client/Server, for supporting communications between mobile devices and local-area network-based PCs. The plan calls for PDAs and other mobile network nodes to have direct ties back to Macintosh, DOS or OS/2 nodes, while the desktop machines would handle certain tasks for their mobile counterparts.

"We're taking the view of being desktop agnostics," said Bert Cummings, a marketing director in Apple's PIE Group, meaning the company will support any desktop operating client from a mobile node. ◼

CBEMA

Continued from page 23

Pickett, president of CBEMA. Throwing out U.S. companies — which have contributed much to European standards — will distort competition. "The ultimate loser will be the European consumer," he said.

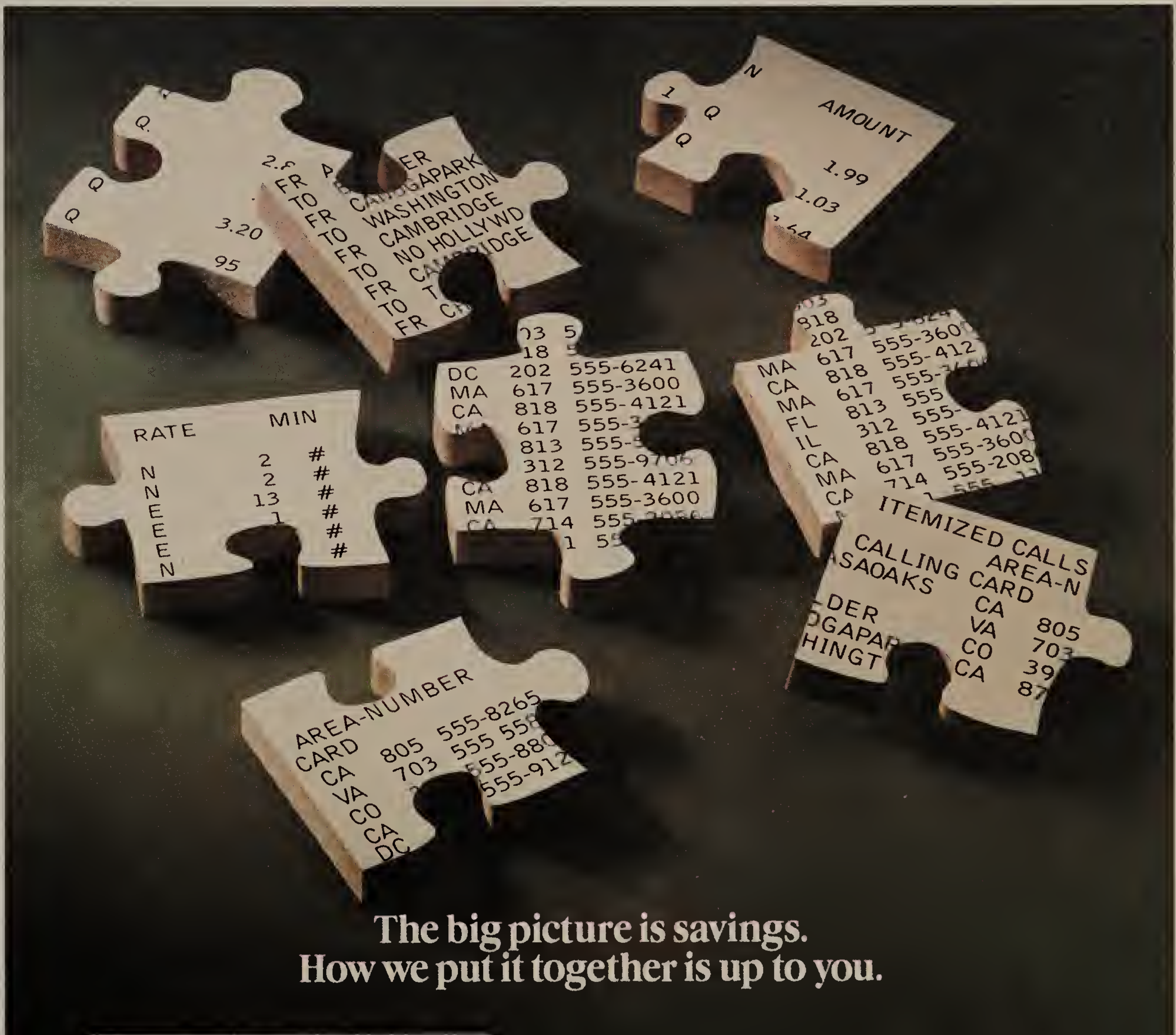
The new ETSI policy breaks with past practice in the standards world, which held that patented technology accepted as a standard would be licensed in reasonable and nondiscriminatory terms.

The new policy discourages cross-licensing of technology and requires the terms of the policy to apply in any part of the world where telecommunications equipment made with ETSI standards is sold. The ETSI policy would not entitle nonsignatories of the policy to receive the same rights in licensing as those companies that do sign it. CBEMA said the policy will lead to a "collective boycott system" in licensing.

ETSI spokespeople have defended the new practice as simply a more efficient way to choose standards so that no time is wasted considering technology that companies might want to keep proprietary.

In its complaint about the policy, CBEMA did not demand that the commission respond in a specific time frame. But if no action is taken by August — when U.S.-based companies are expected to face explusion from ETSI — CBEMA will likely file another complaint with a two-month time limit for response, a spokeswoman said.

Due to the weighted voting arrangement at ETSI, the policy won the broadest support from national European telecommunications operators, as well as the states' closely connected equipment suppliers, such as Alcatel N.V. and Siemens A.G. ◼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BRIEFS

Easel Corp., a Burlington, Mass., application development tool vendor, last week introduced Enfin SQL Edition for AIX Motif, a client/server application development tool for the IBM RISC System/6000. The new version of Enfin is the first step in a planned expansion of the product to multiple versions of Unix. Enfin, an object-oriented tool set, is already available on Windows and OS/2 platforms. The new version for Motif AIX will be available in the third quarter for $7,900.

Easel also unveiled Enfin Commbuilder, which enables software developers to build client/server applications based on existing host-based systems that are networked to personal computers, and Enfin Multimedia, which enables software developers to build sound and image capabilities into client/server applications. Enfin Commbuilder is available now and is included with the Distributed Presentation Option for Enfin for $3,995. Enfin Multimedia will be available in the third quarter for $1,995.

Easel: (617) 221-2100.

Powersoft Corp. and **Wang Laboratories, Inc.** announced a marketing and development agreement under which they will integrate Wang's imaging technology with Powersoft's client/server development tools. The companies plan to offer Wang's Open/image, integrated with Powersoft's PowerBuilder 3.0 development tool, in the fall. Wang will become a partner in Powersoft's Client/Server Open Development Environment program.

Powersoft: (508) 459-5000; Wang: (617) 229-2200.

Informix Software, Inc. last week announced that the city of Salt Lake has begun the implementation of a citywide client/server application based on the Informix-OnLine database server and Hewlett-Packard Co. servers and workstations. The applications, set for completion in July 1995, will support city finance, police, fire, public utility and airport operations, including police reports, fire inspections and billing systems.

The client/server application, which marks a move away from two Unisys Corp. mainframes, will support more than 600 users.

Separately, Informix announced the Informix-Gateway with DRDA, a software product initially designed to give Informix applications running on Microsoft Corp. DOS and Windows clients, as well as Unix clients, access to IBM DB2 and SQL/400 databases. DRDA is IBM's Distributed Relational Database Architecture, a specification that enables client/server tools and applications to access various databases. The new Informix gateway is available on Sun Microsystems, Inc. SPARCstations and IBM RISC System/6000 platforms, with other Unix platforms to follow. The gateway costs $25,000.

Reach Software Corp. of Sunnyvale, Calif., has formed an alliance with **CE Software Holdings, Inc.** of West Des Moines, Iowa, under

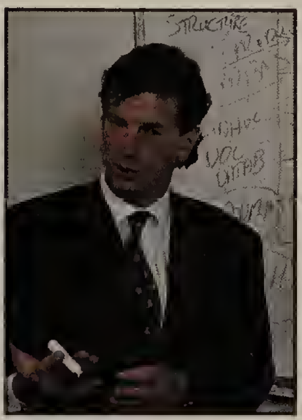
See Briefs, *page 30*

COLLABORATION

Work flow specialist speaks out

Q&A Network managers searching for applications to leverage corporate networks have found a powerful tool in work flow programs, which help increase productivity by coordinating the efforts of multiple workers.

According to Scott McCready, a principal at International Data Corp./Avante, a Framingham, Mass.-based research firm specializing in work flow, the market for work flow software is expected to balloon from $628 million this year to $2.5 billion by 1996.


MCCREADY

Wayne Eckerson, a Senior Editor at *Network World*, recently spoke with McCready about the nature of work flow applications and their impact on corporate networks.

How do you define work flow?

A businessperson defines work flow as being able to take a business process that has some degree of irrationality to it and rationalize or reengineer it. Work flow represents a way to take this business process, formalize it and place it under computer control.

Is work flow making a difference in worker and office productivity?

We've interviewed plenty of users, and I've yet to find one that's not achieved the financial or productivity returns they expected.

Some users are getting their money back in less than three months on a multimillion-dollar investment.

What's the impact on the network?

The network becomes all-important in work flow applications. There is greater imperative to keep the network up and running. If the network is unreliable, work flow applications will become frustrating to use and users will revert to the old, manual ways of doing things.

In addition, network managers will have to be more knowledgeable about the application development environment, desktop requirements and associated peripherals, and how these will affect the network.

See Specialist, *page 31*

Three types of work flow

BY WAYNE ECKERSON

According to their inherent level of complexity and structure, work flow tasks can be segregated into three categories: production, ad hoc and administrative.

That's according to Scott McCready, a principal at International Data Corp./Avante in Framingham, Mass., who recently published a 1,200-page report about the work flow market.

Production-level processes are highly complex and very structured, and typically support mission-critical business applications, such as insurance underwriting and loan origination. These processes can be risky and expensive to automate but can yield tremendous productivity and financial paybacks, McCready said.

Because the integrity of data is critical in production applications, the work flow engine driving such applications is generally based on a relational database management system that has logging, back up and recovery, and auditing capabilities, among other features, he added.

See Work flow, *page 31*

Work flow market segments

Work flow applications can be broken down into 3 categories based on the level of complexity and structure of the tasks undertaken.

Production environments, such as:
- Loan applications
- Insurance underwriting
- Mortgage processing

Ad hoc tasks, such as:
- Strategic planning
- Product design reviews
- Projects

Administrative tasks, such as:
- Expense reports
- Sales proposals
- Purchase requests

SOURCE: INTERNATIONAL DATA CORP./AVANTE, FRAMINGHAM, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Aurum airs field service application

New ServiceTrak to automate process.

BY BOB BROWN

Santa Clara, Calif.

Aurum Software, Inc. last week announced ServiceTrak, a Unix-based client/server application designed to help companies automate their field service processes.

ServiceTrak is designed to help companies dispatch field service personnel faster while automating the process of tracking spare parts and administering contracts. ServiceTrak can also be integrated with call center and help desk applications.

The software is one of five applications sold by Aurum, which specializes in customer resources and support applications. The other applications are: TeleTrak, for telemarketing; SalesTrak, for field sales; SupportTrak, for customer support and help desks; and QualityTrak, for problem tracking, such as with software bugs.

"We're redefining what is meant by customer support," said Mary Coleman, vice president of marketing at Aurum. The company defines customer support to entail a firm's first contact with a client and includes the sale, service and technical support, as well as repeat sales, she added.

Like the other Aurum applications, ServiceTrak is designed to run in a client/server configuration, said David Buchanan, executive vice president at Aurum.

ServiceTrak runs on client systems, including Apple Computer, Inc. Macintoshs, Microsoft Corp. Windows-based personal computers, a workstation running the Open Software Foundation, Inc.'s Motif and an X Window System terminal. The server component typically consists of an SQL database, either from Oracle Corp., Sybase, Inc. or Unify Corp.

AT YOUR SERVICE

ServiceTrak Features
- ✓ Intelligent Call Dispatch
- ✓ Automated Escalation Procedures
- ✓ Problem Resolution
- ✓ Security Controls
- ✓ Verification of Service Contracts

SOURCE: AURUM SOFTWARE, INC., SANTA CLARA, CALIF.

Clients communicate with the servers using the database vendor's connectivity software and will run over any net the databases support.

Also, like other Aurum applications, ServiceTrak can be modified by the user organization, Buchanan explained. Aurum built its applications using Unify's Accell/SQL software — software that Aurum's customers can use to modify the applications to meet their unique needs, Buchanan said.

BASIC FEATURES

Among the basic features of ServiceTrak is a visual display for the dispatcher of a knowledge base consisting of each field service representative's work load, location and areas of expertise, as well as solutions to past problems and information concerning service contracts. This view enables the dispatcher to determine

See Aurum, *page 30*

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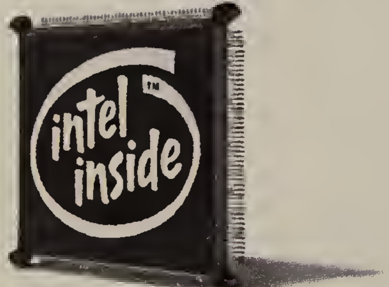

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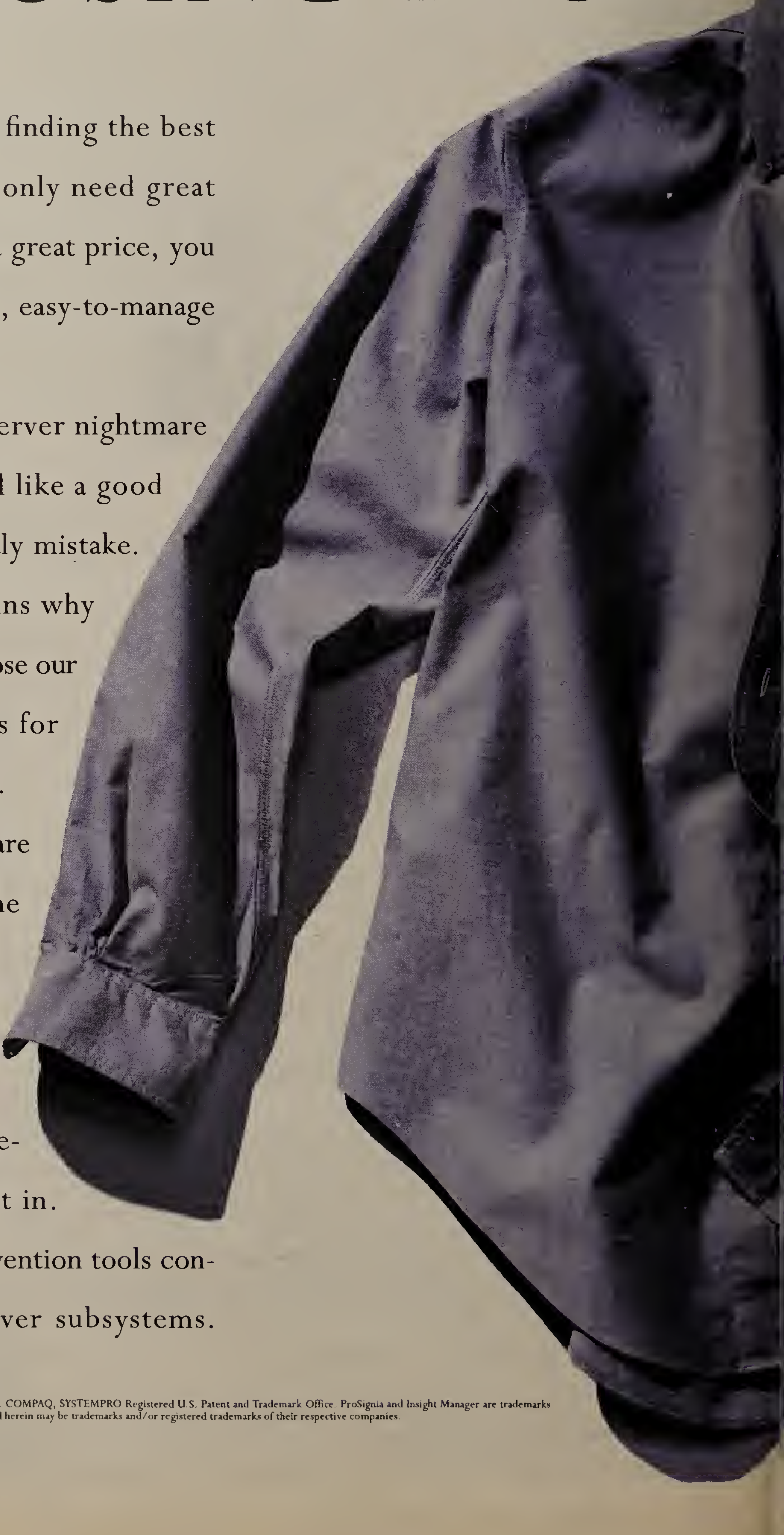

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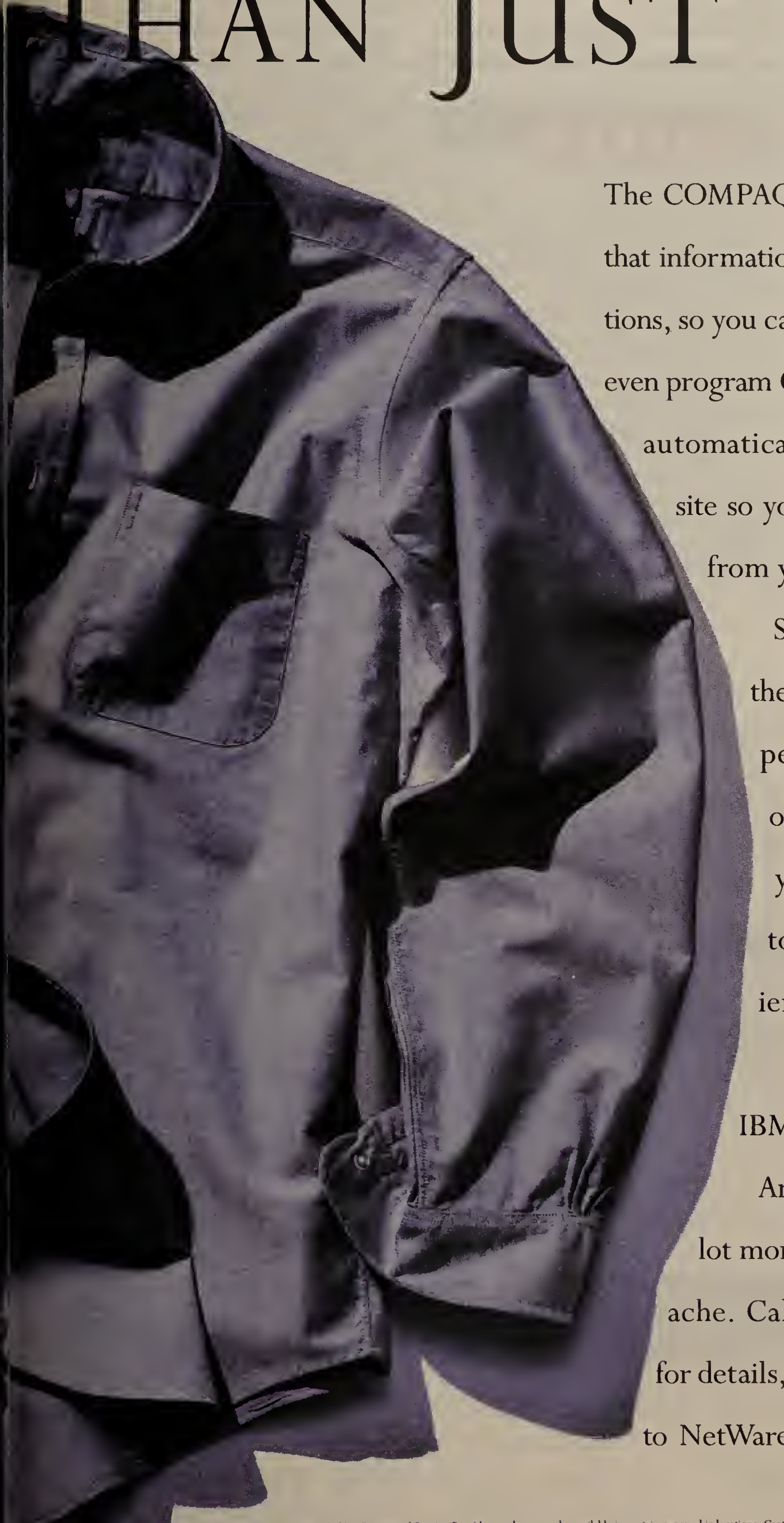

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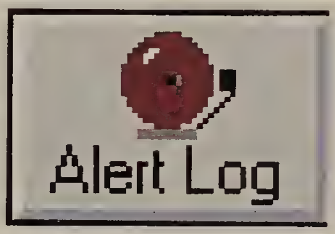

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Q+E ships drivers, teams with Lotus

BY BOB BROWN

New York

Q+E Software, Inc. last week announced at PC Expo here the shipment of its first set of Open Database Connectivity (ODBC) drivers, software that will provide Microsoft Corp. Windows-based applications with database connectivity.

HOLCOMB

Q+E also announced here that it will bundle the Starter Edition of its Q+E Extend for Improv software with Lotus Development Corp.'s Improv for Windows 2.1 when the Lotus spreadsheet starts shipping in mid-July.

The new ODBC Pack 1.0 is designed to provide ODBC-compliant applications, such as Microsoft's Access 1.1 and Lotus' 1-2-3 Version 4 for Windows, with a consistent level of connectivity to personal computer and SQL databases.

ODBC Pack 1.0 includes drivers for databases from Borland International, Inc., Informix Software, Inc., Ingres, Novell, Inc., Oracle Corp., Sybase, Inc. and XDB Systems, Inc. Version 1.1 of the ODBC Pack, which will ship in September, will add support for databases from Hewlett-Packard Co., IBM, Progress Software Corp., Tandem Computers, Inc. and Teradata Corp., as well as support for ASCII text files.

Q+E kicked off an ODBC Developer Program in March to give application providers, database vendors and users early access to Q+E ODBC drivers.

The Q+E ODBC Pack 1.0 costs $199. A subscription service is available for $99 annually and entitles the user to receive updates of all Q+E ODBC drivers.

Q+E's separate announcement with Lotus, involving the bundling of Q+E Extend with every copy of Lotus Improv for Windows 2.1, means that Improv for Windows users will be able to bring data from personal computer and SQL databases directly into their spreadsheet without exiting the spreadsheet. Database access commands have been added directly to Improv's Tools menu.

The bundled product combines the database access technology of Q+E with the data categorizing capabilities of Improv for Windows, according to Richard Holcomb, president of Q+E, which is based in Raleigh, N.C.

The Starter Edition of Q+E Extend for Improv supports dBase and Paradox from Borland, Btrieve from Novell, ASCII text files and Microsoft's Excel XLS files. Additional database access, such as for Ingres, Oracle and Sybase databases, is available using Q+E's Client Server Edition of Q+E Extend for Improv. Improv for Windows 2.1 users can upgrade to the Client Server Edition for $99.

✆ Q+E Software: (919) 859-2220.

Aurum

Continued from page 27

which field service representative is best suited to handle each assignment, he explained.

ServiceTrak also features rules-based technology that allows a problem request to be escalated based on preset parameters. The escalation procedure can include notifying the appropriate person via an electronic mail message or pager call.

ServiceTrak was developed by Aurum with the financial backing of Motorola, Inc., which approached the company with the need for an automated field support application, Buchanan said.

ServiceTrak, which will be available in the third quarter, is priced from $35,000 for 10 users to $350,000 for 200 users.

Going forward, Aurum is looking to integrate ServiceTrak and its other applications more tightly with one another as well as with call center, office automation, and financial and manufacturing applications, Buchanan said.

✆ Aurum: (408) 562-6370.

BRIEFS

Continued from page 27

which CE Software will base its QuickMail Message Handling Service (MHS) for Windows electronic mail product on technology licensed from Reach.

The firms will also work to add forms and rules enhancements to that product, and work to build work flow applications.

CE Software is shipping QuickMail MHS for Windows and Apple Computer, Inc. Macintosh clients at $599 for 10 users.

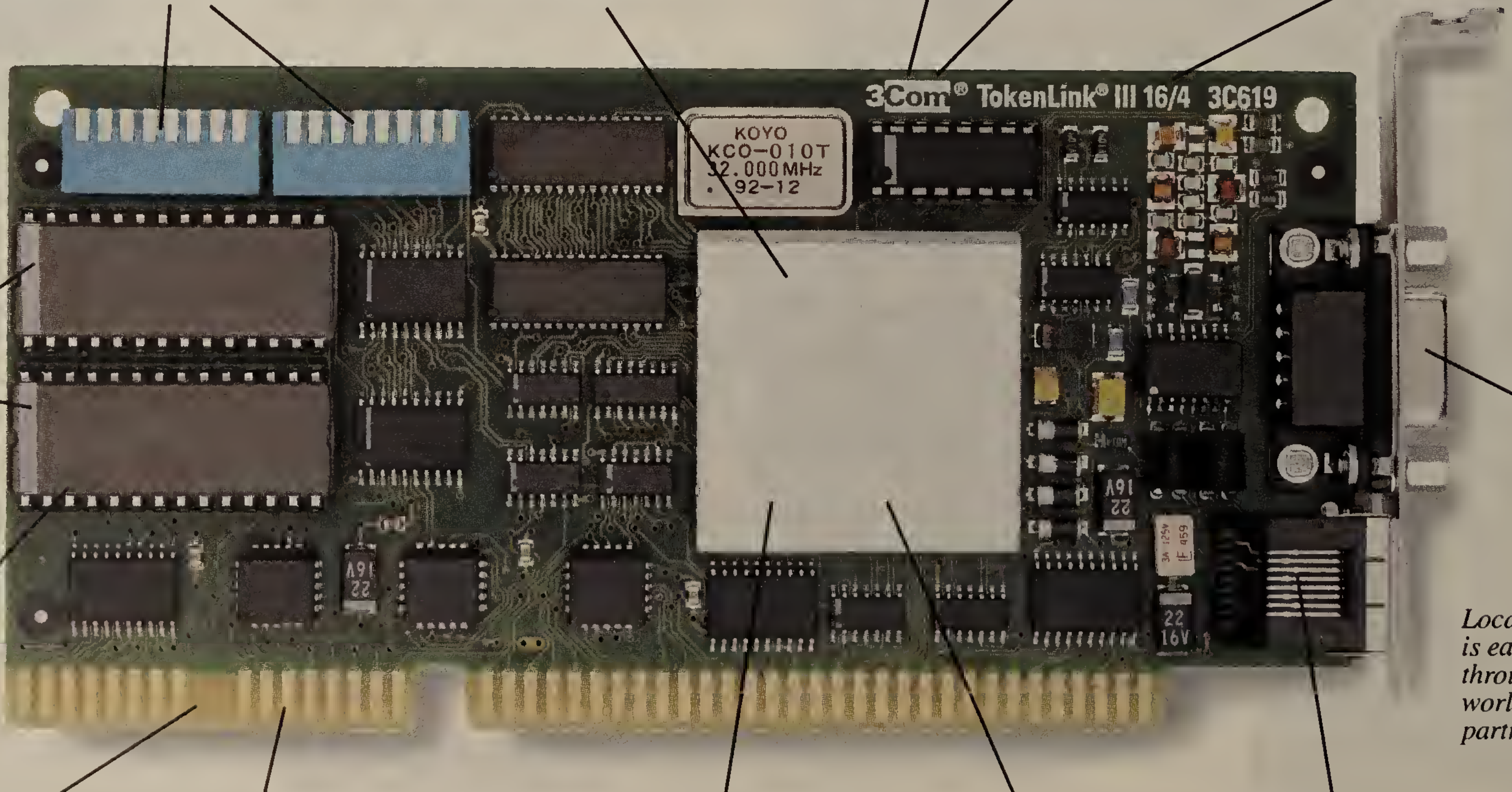
Separately, Reach has partnered with **Watermark Software, Inc.** of Burlington, Mass., to integrate Watermark's imaging software with Reach's work flow software. The imaging software will come bundled with Reach's WorkMan software beginning late this summer at no additional charge.

CE Software: (515) 221-1800; Reach: (408) 733-8685; Watermark: (617) 229-2600.

Unix System Laboratories, Inc. of Summit, N.J., last week said it will bundle Southborough, Mass.-based **NobleNet, Inc.**'s EZ-RPC remote procedure call technology into its Unix software. The EZ-RPC technology will enable users to convert existing C language applications into client/server applications without having to rebuild the application.

PeerLogic, Inc. of San Francisco has announced its Pipes Platform for the IBM OS/2 2.1 operating system. Pipes Platform supports multiple networking protocols and desktop operating systems. The middleware pricing starts at $365 per node.

PeerLogic: (415) 626-4545.



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Specialist

Continued from page 27

How do you know which business processes to automate?

Users need to recognize that there's a relationship between risk and return in selecting work flow projects. Those that generate the highest return also carry the highest risk. Failure to automate these business processes properly could screw up the viability of the company. Most users elect to automate processes that aren't critical to their business. While these applications won't yield immediate financial returns, they change the culture of the workplace and how people work together in a positive way.

How can users identify which technologies are best suited to automate different types of business processes?

There are only two things in the world that have an impact on the way people are organized: the degree of structure and the level of complexity present in the business process.

By mapping these two characteristics, it becomes clear that there are three kinds of work flow applications: production, administrative and ad hoc applications.

All business processes fall into one of these three categories. Each application category has different potential returns and risks, and requires different technologies (see graphic and story, page 27).

Do you see three separate markets for work flow?

Yes. It would be nice to say one product will satisfy all business process requirements, but that is unrealistic. Products that try to do everything and address every work flow requirement end up doing nothing well.

A good example of a work flow product that tried to do everything is AT&T's Rhapsody. AT&T only sold five copies of the product, and only one is still up and running.

If a work flow vendor says they can automate all business processes, run, don't walk, away from them as fast as possible.

So users will have to buy separate work flow products to address the three categories of work flow?

Initially, most users will buy separate products for each area. That's because each department will say that the financial return is great enough that we don't have to justify or worry about making sure that our product integrates with work flow products in other parts of the company right now.

Ultimately, users will be tempted to purchase work flow products from the same vendor to ensure that the products are compatible. Unfortunately, while many system vendors either have or soon will offer a variety of work flow products, most don't have a well-coordinated development effort going on. That means their products may not be easy to integrate — if at all.

Is there a need for interoperability standards?

There is a crying need for voluntary standards as opposed to de facto standards from a dominant player. Right now vendors are saying that their products will enable users to import and export files from other products.

But file exchange services aren't going to cut it. Vendors really need to provide integration on the folder level, which would allow users to log on to other systems, call up and download files and send E-mail. Users should demand nothing less than this level of integration.

Will any vendor dominate the work flow market in the next five years?

It's open. IBM and Digital have an advantage because they have a large installed base of customers that have the infrastructure in place and can add work flow capabilities without making a huge hardware or network investment.

Despite all the hoopla around Lotus Notes, it is a niche product that is filling a huge demand in the ad hoc work flow category. To continue to be successful, Lotus will have to extend Notes with greater E-mail and relational database capabilities to broaden its usefulness as a work flow tool.

Work flow

Continued from page 27

Ad hoc processes are less structured and complex, and usually involve white-collar workers engaged in short- or long-term projects. Ad hoc work flow applications can improve teamwork and productivity, and are moderately priced to implement — about $900 per seat.

Document databases, such as Lotus Development Corp.'s Notes, function best at the technology engine for ad hoc work flow applications. These applications also must have a graphical user interface and be easy to program or modify to meet project needs, according to McCready.

Administrative tasks are simple processes that have minimal structure. Because these processes are usually highly distributed and can be initiated by hundreds of people, electronic mail is the best technology foundation for administrative work flow applications, he added.

Administrative applications cost the least to implement — about $200 a seat — and can be used with minimal risk, but the financial returns are smaller.

Three types of work flow

Type	Architecture	Cost (per seat)	Major vendors
Administrative	E-mail	$200	Action Technologies, Inc. Beyond, Inc. Da Vinci Systems Corp. Digital Equipment Corp. Reach Software Corp. Verimation, Inc.
Ad hoc	Document databases	$900	Boss Logic Documentum Keyfile Corp. Lotus Development Corp. Portfolio Technologies, Inc.
Production	Relational databases	$2,000	FileNet Corp. NCR Corp. Plexus Software, Inc. Recognition ViewStar Corp.

SOURCE: INTERNATIONAL DATA CORP./AVANTE, FRAMINGHAM, MASS.
GRAPHIC BY SUSAN J. CHAMPENEY

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Editorial

It is the little rift within the lute,
That by and by will make the music mute,
And ever widening slowly silence all. — Tennyson

A couple pre-PC Expo events in New York last week offered insights into two worlds — hardware and software — separated by a growing rift.

Intel's Partners in Innovation program was the PC industry's version of Muscle Beach, with IBM, Dell, Compaq, AST, Hewlett-Packard and others displaying the newest, fastest machines, including symmetric multiprocessing Pentium servers.

Across the exhibit area in the ornate Metropolitan Club, the servers silently number-crunched while graphics, spreadsheets and CAD drawings danced in little windows on their monitors. Link these machines with their desktop brethren in a LAN and you have a mainframe on a string, as it were.

The only problem is developing software that utilizes all this distributed power — a thought that kept occuring to me, oddly enough, as Novell extolled its new AppWare at a press briefing in the Museum of Television History.

The company claims that AppWare will revolutionize development of network applications, but revolutions in software sure aren't the same as those in hardware, where a new chip brings an order of magnitude change in power.

Don't get me wrong: AppWare is an important advance that will have a big impact given Novell's stature. Masking the diversity of desktops and network resources will ease development of network applications.

But it will be a while before all the pieces of AppWare roll out and vendor backing translates into products that actually fit into the framework. And AppWare will really only be as useful as the tools that tie into it. It comes with a visual applications builder, but it's not a fully featured development environment by itself and the development systems it will support are all limited in their ability to solve the distributed applications puzzle.

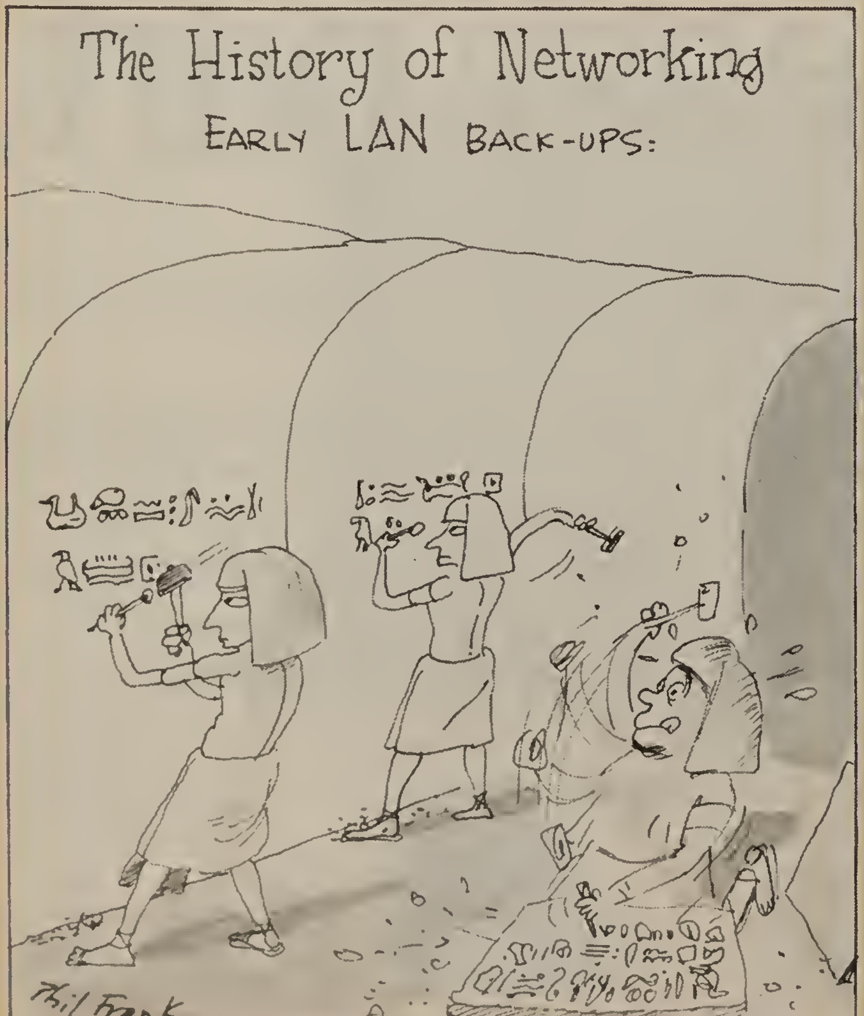
AppWare helps eliminate some of the complexity in a network environment and that's useful. But it's clear that the gap between hardware power and our ability to develop applications that use that power continues to widen.

How do we narrow that gap? Let me know what you think.

✏JOHN GALLANT

Teletoons

FRANK AND TROISE



DATABASE UPDATE

By Richard Finkelstein

Is Windows worth the effort?

Problems with Microsoft Corp.'s Windows are making it very difficult, if not impossible, for users to deploy client/server applications within budget and on schedule. Instead of adopting a technology that will cause chronic problems for years to come, it's time to start seriously looking for a more suitable alternative.

One of the fundamental reasons to use a client/server architecture is to allow a user to access a centralized database from a variety of front-end tools and to manipulate the information within an intelligent graphical user interface (GUI). However, Windows provides this functionality at a large cost.

Windows is saddled with fundamental architectural weaknesses that make it susceptible to frequent, unpredictable and unavoidable crashes. Windows is based on the DOS operating system, which was never intended to manage multiple tasks. When an application requests DOS services, it enters into unprotected memory space where it can collide with other applications and with DOS itself. These collisions have many outward manifestations, including General Protection Faults, corrupted files and a blank screen known as the "Black Screen of Death." Debugging these problems can be the most frustrating and time-consuming aspect of using Windows.

What makes debugging under Windows so difficult is that there are no boundaries to the problem. The trouble can be coming from anywhere or anything, and there is no methodical approach to isolate random bugs. Developers must, therefore, use trial and error techniques to try to isolate the problems that may not even be within their programs. This requires developers to not only understand application development, but also become Windows, personal computer and networking specialists — a jack of all trades.

I sometimes wonder whether more time is being spent these days trying to get operating systems and networks to work than actually developing useful applications. All of this effort takes time and money.

But it is the end user who is most affected by the subtle problems of Windows. End users must put up with unpredictable crashes and network failures, which can cause corrupted or lost data as well as lost work. Many users, including me, have made continual "file saving" part of our regular work flow, hoping this will minimize the amount of work lost due to unpredictable Windows problems.

Random bugs and crashes, such as those associated with Windows, are complicating user moves from stable mainframe and minicomputer systems to the more unpredictable PC environment. A recent article in *The Wall Street Journal* reported on the unexpected costs and schedule delays that organizations experience while downsizing. To be sure, not all of these problems are related to Windows. Problems are emanating from all aspects of the client/server technology, in-cluding the hardware, application software and network operating systems.

However, Windows is certainly one of the primary instigators of application development delay and is a chronic headache in production applications.

Windows is not the only major operating system with no protection. Novell, Inc.'s NetWare 3.11 running Netware Loadable Modules is also missing protection. This major design fault is only somewhat addressed in NetWare 4.0, which provides some partial protection — at the cost of performance.

What we need are alternatives, which are currently in short supply. OS/2 is always an alternative, but the market seems to be rejecting it for many reasons, not the least of which is the lack of native applications. OS/2 2.1, with Windows 3.1 support, may turn things around. Because Windows 3.1 applications running under OS/2 can take advantage of OS/2's memory protection facilities, collisions between applications are less likely to occur. However, it remains to be seen whether any third-party vendors will support native OS/2 applications. Without native application support, there is little long-term hope for OS/2.

Another possibility is Novell's UnixWare. Novell is pulling out the stops trying to get its version of Unix accepted as a mainstream desktop operating system. Users can run DOS and Windows applications under UnixWare, and Novell has upgraded the GUI so that it provides a viable Windows alternative.

Like OS/2, UnixWare needs third-party support, but it will fit comfortably on existing Novell networks and Novell is gathering support for it within its established channels.

Both OS/2 and UnixWare are far better choices for client/server applications. Both have robust operating capabilities, such as memory protection and preemptive scheduling, and are, therefore, more stable choices.

Windows is and will continue to be an important desktop operating system, but I think organizations are just beginning to realize the many hidden costs and risks associated with using Windows for client/server deployment. It is time to ask whether Windows is really worth it or whether it's time to pursue other options.

✏Finkelstein is president of Performance Computing, Inc., a consulting company in Chicago that focuses on client/server and rightsizing applications. He can be reached at (312) 549-8325 or via CompuServe at 72240,2536.

Corrections

Due to a production error, the wrong photograph ran with James Kobielus' column "End-to-end support will require changes" (June 21, page 40).

Due to a printing error, the number "4" appeared instead of a check mark in the following columns of the Buyer's Guide chart "High-end LAN servers" (June 28, page 43); under the "Processors" heading, the SMP column; under the "Memory" heading, the ECC column; and under the "Fault tolerance" heading, hot-swappable external disk, hot-swappable internal disk, UPS, bus parity checking and memory parity check-

USER FORUM

By Craig Paul

Scanner laws not strict enough

Two recent laws passed by Congress regarding the ownership of scanners and receivers that are capable of decoding digital cellular transmissions don't go far enough to protect the privacy of users' digital cellular transmissions. For network managers considering extending their corporate nets to take advantage of the burgeoning wireless communications technology, this lack of privacy should be chilling.

The first law, called the Anti-Scanner Law, prohibits most people from owning scanning radios capable of receiving analog and digital transmissions, and retrofitting current equipment to decode digital cellular transmissions. After April 1994, new scanners capable of scanning cellular frequencies will not be certified for domestic use and will, therefore, be difficult to obtain.

However, people who currently own such scanners could use them illegally to intercept users' cellular transmissions.

In fact, it's even possible to intercept analog cellular calls using the UHF tuner on a television set.

A separate federal law was passed to specify who is legally permitted to own this type of equipment. According to the law, ownership of scanning receivers is limited to federal, state and local government authorities, as well as electronic communications service providers — including cellular carriers.

This list is quite puzzling. Presumably, the electronic communications providers would need the scanning receivers to monitor their service's signal quality and decode the digital signals.

But among government authorities, only the Federal Communications Commission would possibly need to use scanning receivers to check the purity of radio emissions to ensure that cellular transmissions do not interfere with other services. The FCC would not, however, need to decode digital cellular transmissions to fulfill its duties.

There is no need for any government authority to own equipment that can both receive and decode digital cellular transmissions. All cellular communications, even a call from one cellular phone to another, must go through the regular "wired" telephone network to complete the telephone call. Since law enforcement agencies can tap any call within the wired network by obtaining a court order, even those agencies have no need to own such equipment.

The law allowing government agencies and electronic communications service providers to own these receivers sets a bad precedent for the privacy of voice and data transmissions on the digital wireless networks in the near future.

It's surprising that the Anti-Scanner Law's major proponent, the Cellular Telecommunications Industry Association (CTIA), hasn't extended the fight to help "ensure the privacy of cellular communications" (the stated purpose of the Anti-Scanner Law) to the digital domain. Therefore, the initial push to ensure digital cellular privacy appears to be up to users.

Network managers considering extending their corporate digital networks outside of their "wired" domain need to take action to ensure that their company's digital voice and data transmissions will be more secure.

Those who want such privacy to be legally guaranteed should contact the CTIA and express their concern about the lack of restriction on government agencies and electronic communications providers that can now legally own equipment to receive and decode digital cellular transmissions. Contact Massachusetts Congressional Representative Edward J. Markey, head of the Subcommittee on Telecommunications and the Finance Committee on Energy and Commerce, and tell him that current and future wireless digital networks need additional measures in order to ensure the privacy of voice/data transmitted on them.

The FCC is currently soliciting proposals regarding technology to enhance the privacy of such networks. If you have a preference for commercially available technologies that enhance wireless network voice/data privacy, let the FCC know now.

✏ Paul is a wide-area network specialist at the Kansas University Computer Center in Lawrence, Kan. He can be reached via the Internet at paul@kuhub.cc.ukans.edu.

Letters

ATM: Can't get enough of it

In response to your editorial asking readers whether they feel you have been devoting too much coverage to Asynchronous Transfer Mode (ATM) (June 21, page 40), I feel that the more ATM information you provide, the better it is for me.

My project is a multiyear process of replacing all our workstations and our local- and wide-area networks. At this time, it seems ATM is the right scheme for the new LANs and WAN, but we have a lot to learn before we can achieve our goals. *Network World* is a very important source for the information we need.

Bruce Ressler
Electronics engineer
Automation Applications Division
U.S. Department of Transportation
Cambridge, Mass.

Too much on ATM

I agree with the readers that said ATM has been overhyped. It seems that the whole network press, not just *Network World*, has ATM mania. This does a disservice to your readers. The constant hype of ATM long before it is a deployable technology only serves to spread additional fear, uncertainty and doubt among network managers deciding on new installations or upgrades to their existing networks. This then causes existing technologies to languish and users' needs to go unmet while the decision process is prolonged.

This is not a problem unique to ATM. The same thing happened to Fiber Distributed Data Interface. Long before the seemingly eternal standardization process was complete, the press was cheering FDDI as if it was ready to be installed immediately. Early adopters of FDDI went through several years of distress as the standard evolved and the interoperability glitches were ironed out.

ATM is at an early stage in its evolution. The standards are not complete. Interoperability between multiple vendors has rarely been tested, let alone proven. Adopters of ATM at this point in time are pioneers on the "bleeding edge;" they are very likely to undergo the same agonies as the early adopters of FDDI. And while the ATM Forum is working to address these issues, it is my opinion that ATM is still two years from becoming a mainstream network technology.

I feel that your readers deserve thoughtful, insightful and incisive articles that provide the information they need to make educated decisions about available network technologies to help solve their problems today, not to create new ones. I hope I will see more of this type of article in *NW* in the future.

Bob O'Hara
Manager, systems solutions and architectures
Advanced Micro Devices, Inc.
Sunnyvale, Calif.

Clarifying issues of 800-portability

I'd like to comment on the customer confusion and service outage described in the article "Carrier spat lands user in 800-portability limbo" (June 14, page 1). While the article raised several key points that customers must be aware of in the postportability environment, two additional areas need to be discussed to accurately portray the process the industry has developed to switch 800-service customers between carriers.

First, the activity involved in changing the Responsible Organization (RespOrg) from one carrier to another *does not* affect the information in the Service Management System database that identifies the correct carrier to route the traffic to. That information, the Carrier Identification Code (CIC), is usually changed by the new carrier *after* the RespOrg change has been made.

See Letters, *page 43*

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NET MANAGEMENT PLATFORMS

Buyer's guide

Putting an end to the Swivel shuffle

BY STUART AARON, MARVIN CHARTOFF & BOB REINHOLD

The days of twisting and turning in a swivel chair to view the multiple terminals needed to manage complex internets are numbered.

Users are increasingly opting for a new breed of internet management platform that provides needed relief for the harried net management guru by bringing control of a diverse set of network elements under one umbrella.

Epitomized by such well-known packages as Hewlett-Packard Co.'s HP OpenView Network Node Manager 3.2 and SunConnect's SunNet Manager 2.1, these platforms provide a basic infrastructure for running multiple element management applications, each designed to manage a specific vendor's network device. They also run applications that provide basic management functions such as inventory control and trouble ticketing.

As an outgrowth of the effort to build large integrated network management platforms that would act as a central manager for a series of smaller element management systems, this class of product enables users to directly monitor and control multiple vendors' devices from a single workstation. This is accomplished by providing a software environment consisting of application program interfaces (API) that enable multiple applications to share access to such common services as a management database and a graphical user interface (GUI). Standard management protocols, such as the Simple Network Management Protocol, and common network protocols are used to interact with managed devices.

Device vendors — or users — can take advantage of the available APIs as well as common management and networking protocols to write applications that run in the environment. These management environments display network configuration and status information on a color-coded network map.

At the high end of the market are management platforms supporting a wide range of applications, standard protocols and core services. Typically, high-end management platforms support open APIs that have enabled large numbers of device vendors to port their stand-alone management applications to the platform.

High-end platforms run on a variety of operating systems and hardware, with the most common being Unix-based workstations. A major exception is Novell, Inc.'s DOS-based NetWare Management System 1.1 (NMS), which was designed as a common platform to run Novell and third-party applications for NetWare environments. High-end products can be used in centralized or distributed management environments.

Low-end management platforms run a limited set of applications, such as alarm generation or configuration management, and support a limited number of protocols and managed devices. For example, a low-end platform might only manage components on a Transmission Control Protocol/Internet Protocol net. They run on a limited number of operating systems and hardware, with the Microsoft Corp. Windows environment being the most common, and generally support only a single centralized management station. Any APIs supported by low-end systems are usually limited, providing access to only a subset of the platform's core software infrastructure.

Many customers find that selection of a management platform and the devices it will handle should be done in tandem (see story, page 41).

"You need a platform that can support all the components in your network, but choosing the platform and the components goes hand in hand," says Rick Baxter, senior technical support specialist at The Methodist Hospital in Houston. "You can't choose a router or wiring hub without impacting your management platform decision. Similarly, your management platform decision will limit your device options."

LIKE A JIGSAW PUZZLE

When the platform and devices have been selected, users will be able to create a meaningful picture of their networks by fitting the pieces together as if they were part of a jigsaw puzzle. The management platform acts as a table on which to assemble the puzzle. If the table is too small, it will not be able to hold all the pieces users need to put the puzzle together.

The framework for the puzzle is the ability to consolidate network alarms and alerts from multiple vendors' devices. Filling in the rest of the puzzle requires the ability to support value-added applications and tools, making the breadth of application support the single greatest factor in selecting a management platform.

"We realize that managing our products is just one piece of the user's network management requirements," says Eric Andrews, product manager at Newbridge Networks, Inc. "By designing our products to an open management platform, we allow users to integrate our piece with all of the other management functionality they require."

The Short List
Network management platforms

- ✓ Cabletron Systems, Inc.'s Spectrum 1.1.3
- ✓ Hewlett-Packard Co.'s HP OpenView Network Node Manager 3.2
- ✓ IBM's AIX System View NetView/6000 2
- ✓ Novell, Inc.'s NetWare Management System 1.1.
- ✓ SunConnect's SunNet Manager 2.1

Complete details about The Short List appear on page 41.

Applications fall into two basic camps: core functional applications and element management applications, both of which come bundled with the platform or can be purchased as add-ons (see chart on page 42). Core management applications are in line with the five key management services identified under the Open System Interconnection model: fault management, performance management, con-

Continued on page 36

What to consider when buying a mgmt. platform

There are many steps a user must take when selecting a network management platform. The best place to start is to clearly define the functional requirements the selected system must provide and the role it will play in current and future network management strategies. Once these have been defined, competing products can be evaluated by examining a number of key points, including the following:

Support for value-added applications and tools: This is the real distinguishing factor between products and is fully covered in the Buyer's Guide starting on this page. The applications and tools a management platform provides determine to a great extent the variety of devices it will manage, how well it will perform such user-specific tasks as storing historical data and generating custom reports, and how easy it will be to build new applications.

Product architecture: This is just as important as applications and tools support because the product's underlying design determines whether it will provide sought-after functionality or can be easily customized to gain that functionality. A product designed to be an alarm consolidator is not as valuable as one that runs third-party device management applications.

Ability to distribute management functions: Users with geographically disperse nets and those that delegate primary management responsibilities to departments should examine how well a platform supports the distributed processing features that are spelled out in the story on page 36.

Support for security and access control: As pointed out in the Buyer's Guide, the platform should provide security management features that lock unauthorized users out of the management system itself or from certain management applications.

Pricing structure: Net management platforms are so highly modular that users must understand which applications and tools are built into the price and which come with additional expense.

Fitting the organizational style tightly

Just as it must exhibit the ability to run a mix of applications that manage the diverse set of Internetwork devices spread across an enterprise, a network management platform must fit tightly with a firm's organizational style, as well.

Some companies prefer to control entire networks from one centralized workstation. Others choose to divy up management chores along geographic or device lines and spread those chores across multiple centralized workstations. And still others want individual departments to have workstations that manage departmental resources.

While all management platforms listed in the chart on page 40 support the single centralized workstation concept, several have varying degrees of support for distributing management chores.

Network management platforms offering distributed management functionality can be configured in different ways such as:

■ **Client to server.** This approach features a central management server that is responsible for collecting and processing management data for the entire network. That server parcels out data to individual client workstations that are responsible for managing distinct parts of the network. Hughes LAN Systems, Inc.'s Monet Network Manager 5.1 and MAXM Systems Corp.'s MAXM both operate in this configuration.

■ **Peer to peer.** This approach enables users to dedicate individual management workstations to manage a particular network domain, such as a geographic region or a specific set of devices. This is how IBM LAN Network Manager operates. If they are configured to do so, these domain managers can exchange information.

■ **Multiple domain.** This is a hybrid approach that features multiple domain servers, each of which supports multiple clients responsible for managing a specific part of the domain. Most management platforms can be configured to support multiple domain management operations.

The multiple domain approach allows the most flexible implementation. It builds a network management hierarchy in which responsibility can be distributed but information on the health and status of the network can be viewed from a centralized location.

This approach is especially attractive for global networks, where you may want to avoid transporting network management traffic across scarce transoceanic bandwidth while giving autonomy to in-country staff.

➨ Stuart Aaron, Marvin Chartoff and Bob Reinhold

Continued from page 35

figuration management, accounting management and security management.

Applications that make it possible to display fault management information, such as alarms and events, and performance management information, such as traffic statistics, are included in all management platforms listed in the Buyer's Guide chart on page 40. Configuration management applications that maintain information about how a network is configured are generally provided by third parties.

Accounting applications typically take the form of inventory tracking modules provided by the platform vendor or through an OEM agreement. Security management applications generally handle user names and passwords and are usually provided by the platform vendor. Some security applications control access to other applications or the management system itself, while others control access to both. Some platforms provide a hierarchical security structure that gives some users more privileges than others.

One emerging core application that some users find interesting is an expert system, which is useful in correlating the multitude of alarms received when a network element fails and providing suggestions for the root cause of all the alarms. Cabletron Systems, Inc.'s Spectrum 1.1.3, IBM's AIX System View NetView/6000 Version 2, NCR Corp.'s StarSentry Systems Manager 3.6, Novell's NMS, Nynex Allink's Allink Operations Coordinator 2.5 and HP's HP OpenView Network Node Manager all provide an expert system module.

Another key core application provided by most management platforms is the ability to automatically discover active components on the network and construct a network map. Every management platform except D&G Infosystems, Inc.'s LANWatchMan 1.0.0 and Nynex Allink Operations Coordinator provide an autodiscovery feature.

ELEMENT APPLICATIONS

End users and third parties can use APIs to build element management applications that use the services provided in the core management applications. These element management applications can monitor, configure and control specific network devices such as intelligent hubs, protocol analyzers and routers. Element management applications are provided by the device vendor or platform vendor.

Several large management platform vendors recently agreed to develop standard APIs, which can spur rapid growth in element management applications. The Network Management Forum's Action-Team for Integrated Management Systems committee has also been pursuing development of application-to-application APIs that promise to enable independently developed applications to share collected information and provide an integrated view of the network's status.

Device vendor-developed element management applications typically run on multiple platforms. For instance, Wellfleet Communications, Inc.'s Site Manager router manager runs on Cabletron's Spectrum, HP's HP OpenViewNetwork Node Manager, and SunConnect's SunNet Manager. Similarly, SynOptics Communications, Inc.'s Optivity hub management application runs on SunNet Manager and is being ported to OpenView Network Node Manager, NetView/6000 and Novell NMS. Some key element management applications run on only one management platform. Cisco Systems, Inc.'s Cisco Works, for instance, runs only on SunNet Manager.

Applied Computing Devices, Inc., Cabletron, Data General Corp., HP, IBM (on NetView/6000) Novell, Nynex Allink, SunConnect and VisiSoft, Inc. all run applications that manage many types of devices, including the leaders in each segment of the local-area network market. Other products, such as D&G's LANWatchMan and IBM's LAN NetView, support just a few types of devices. Still others, such as Hughes LAN Systems, Inc.'s Monet Network Manager 5.1, in particular, support a reasonably large number of devices but are basically targeted at market niches. For instance, Monet Network Manager is best suited to manage hubs, including Hughes' Enterprise Hub, although it can manage SNMP devices.

Core and element management applications also use the platform's management protocol to exchange data with managed devices. SNMP and OSI's Common Management Information Protocol (CMIP) are the two key protocols used today, although SNMP is by far the most common and can manage everything from frame relay services to uninterruptible power supplies.

SNMP defines a Management Information Base (MIB), which consists of a collection of operating and management parameters for various devices. For instance, there is a collection of parameters for routers and hubs. There are currently two standard MIBs — MIB I and II. MIB I provides basic parameters, while MIB II is more robust. There is also a Remote Monitoring MIB that enables SNMP-equipped management platforms to

Continued on page 40

Users air platform gripes

Despite the ballyhoo about the ability of network management platforms to simplify and centralize network management, many readers voiced gripes about the systems in a recent *Network World*/Focus Data, Inc. reader survey.

Management platform selection criteria

Based on highest possible score of 10

Criteria	Importance rating	Satisfaction rating
Reliability	9.3	7.8
Conformance to standards	8.9	7.9
Service/support	8.5	7.6
Ease of use	8.1	7.1
Number of third-party applications	7.6	6.5
Distribution features	7.4	6.4
Core applications	7.3	6.9
Conformance to management environments	7.0	6.8
Price	6.7	6.3
Ease of writing custom applications	5.9	6.5

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

"The biggest issue for me is that these packages do not truly manage the enterprise network, only parts of it," says one reader. "You still require another system to integrate [several] management functions — for instance, WAN circuits."

Other shortcomings frequently cited by readers were the lack of support for a customized Management Information Base, heavy network traffic loads generated by the platforms, difficulty in learning to use the net management platforms and difficulty in distributing management functions across multiple sites.

Of the 100 readers surveyed, 56 currently own one of the platforms listed in the chart on page 40, and 44 are now evaluating one.

Novell, Inc.'s NetWare Management System was cited by 26% of those surveyed as the platform that is now or will be installed. Hewlett-Packard Co.'s HP OpenView Network Node Manager was cited by 20%. SunConnect's SunNet Manager was cited by 18%, while IBM's LAN NetView was cited by 11%, Digital Equipment Corp.'s Polycenter products and IBM's AIX System View NetView/6000 by 9%, Cabletron Systems, Inc.'s Spectrum by 3% and other products by 4%. The other 9% didn't know.

Unsurprisingly, the Simple Network Management Protocol was the most common management protocol in use, with 82% of readers using it now or planning to use it as their primary protocol. The Common Management Information Protocol was cited by only 2% of the readers.

Readers were asked to rate their top selection criteria on a scale of one to 10, with a highest possible score of 10. They were also asked to rate how satisfied they were with how their management platform met each criterion. In every case except for one, the average satisfaction rating was less than the importance rating.

The exception was with the ease of writing custom applications. While readers, on average, said that is less important than any other criterion, giving it a 5.9 importance rating, they gave it a 6.5 satisfaction score.

By Kyle Nitzsche

Buyer's preferred price ranges for management platforms

Price	Percent
$1,000-$1,999	6.8
$2,000-$2,999	8.5
$3,000-$3,999	11.8
$4,000-$4,999	3.4
$5,000-$9,999	13.6
$10,000-$14,999	13.6
$15,000-$19,999	11.8
$20,000-$24,999	11.8
$25,000-$29,999	3.4
$30,000-$39,999	5.1
$40,000-$49,999	1.7
$50,000-$59,999	3.4
$60,000-$99,999	1.7
$100,000 and more	3.4

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

Focus Data, Inc., a Framingham, Mass.-based market research firm, gathers data from end users to determine network and information systems usage, trends, needs and satisfaction levels. For more information, call Mona Dabbon, (508) 626-2556.

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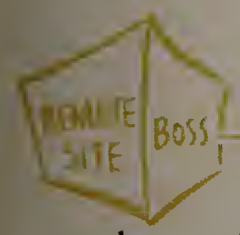

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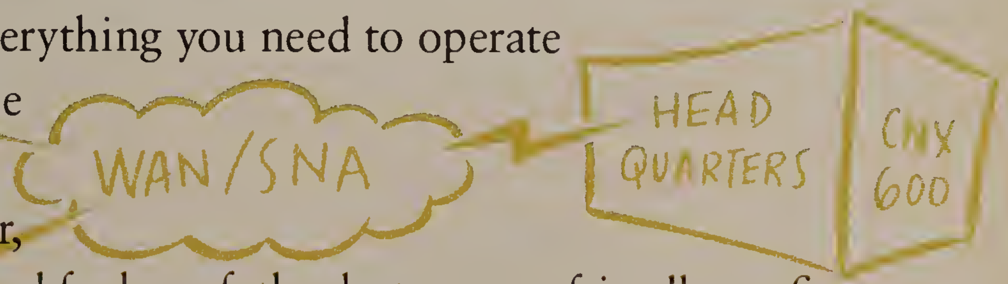

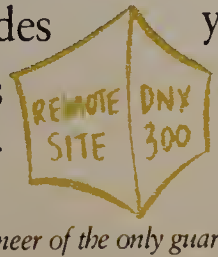

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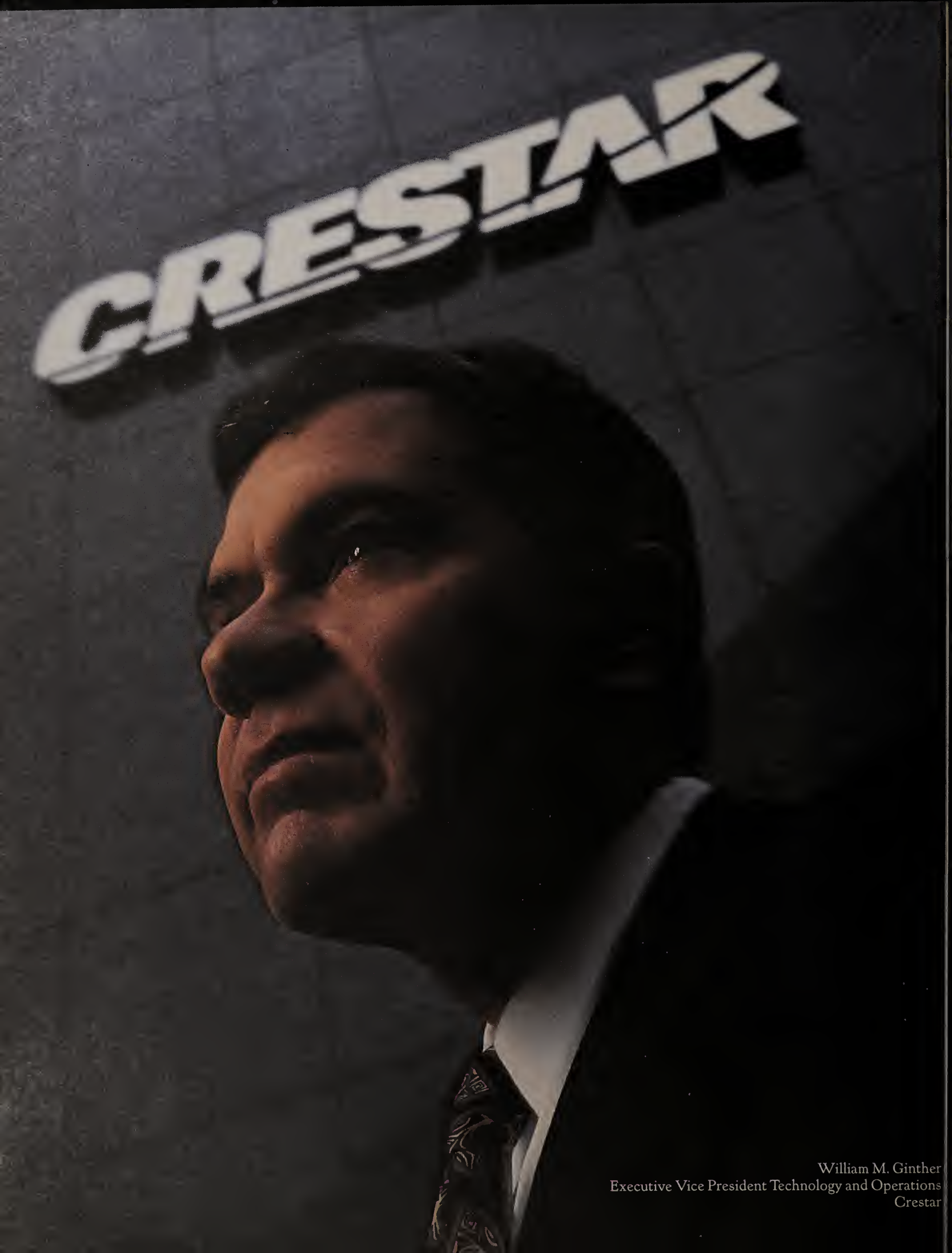

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LAN management platforms

Company	Product	Platforms supported								GUI environment	Network protocols	Minimum configuration (M bytes)	Management protocols					Mgmt. environment	Distribution of mgmt. functions	Password access to:	Customization	SNMP MIB options by device: B = Bridge/routers C = Concentrators I = Intelligent hubs P = PCs Pa = Protocol analyzers S = Servers		License method	Price range
		AIX	DOS/Windows	HP/UX	OS/2	SunOS	Ultrix	Windows NT	Other	L = OpenLook M = Motif O = OS/2 Presentation Manager W = Windows	D = DECnet I = IPX/SPX O = OSI S = SNA T = TCP/IP X = Other	M = Memory S = Storage	CMIP	NMVT	RMON MIB	1 = SNMP 2 = SNMP2	X.700	D = DME N = NMS O = OMNIPoint	M = By machine U = By user	A = Applications S = System	A = Applications M = Menus R = Reports S = Screens	Standard MIB	Custom MIB extensions	G = Per group of users S = Per site U = Per user	U = Unlimited
Applied Computing Devices, Inc. (812) 232-6051	Network Knowledge Systems 4.X	✓					✓		✓	M	O, S, T, X	M: 1,000 S: 128		✓		1		O	M, U	A, S	A, M, R, S	B, C, I, P, Pa, S		G (1)	$65,000-U
Cabletron Systems, Inc. (603) 332-9400	Spectrum 1.1.3	✓				✓	✓		✓	M	D, O, S, T	M: 150 S: 32		✓		1			M, U	A, S	A, M, R, S	B, C, I, P, Pa, S	B, I, P, S	S	$18,000-U
Data General Corp. (800) 328-2436	OS/EYE*NODE 1.0					✓			✓	M	O, T	M: 700 S: 24	✓	✓		1, 2			M	A, S	A, M, R, S	B, C, I, P, Pa, S	P	S	$18,000
Digital Equipment Corp. (603) 881-2299	Polycenter SNMP Manager 300 1.2						✓		✓	M	D, T, X	M: 300 S: 24			✓	1	✓	O	M, U	S	A, M, R, S	B, C, I, P, Pa		G	$3,000-$6,000
	Polycenter Network Manager 200 and 400 1.3						✓		✓	M	D, O, S, T, X	M: 500 S: 32	✓	✓	✓	1	✓	O	M, U	A, S	A, M, R, S	Pa	B, C, I, P	G	$14,700-U
D&G Infosystems, Inc. (516) 538-1240	LANWatchMan 1.0.0		✓							W	I	M: 2 S: 2								A, S	A, R		P, Pa, S	S	$1,295
Hewlett-Packard Co. (800) 637-7740	HP OpenView Network Node Manager 3.2	✓	✓	✓	✓	✓			✓	M	D, I, O, S, T	M: 600 S: 48	✓		✓	1		D, O	M, U	S	A, M, R, S	B, C, I, P, Pa, S	I	G, U	$15,750
Hughes LAN Systems, Inc. (415) 966-7300	Monet Network Manager 5.1					✓				M	T	M: 424 S: 32			✓	1			U	S	A, M, R, S	B, C, I, P, Pa	B, C, I	G, U	$7,450-$19,995
IBM (800) 342-6672	IBM LAN Network Manager 1.1				✓					O	D, I, O, S, T, X	M: 40 S: 12	✓	✓						A, S	A, R, S			U	$1,365-$5,240
(800) 426-2255	LAN NetView		✓		✓					O	I, T, X	M: 21 S: 10							M		A, M, R, S	B, C, I		U	$1,970
(800) 426-6865	AIX System View NetView/6000 2	✓								M	D, T	M: 100 S: 32	✓	✓		1		D, O	M, U	S	A, M, R, S	B, C, I, P, S	P	G, S	$4,500-$15,650
MAXM Systems Corp. (703) 761-0400	MAXM with MAX/SNMP 2.1.2	✓			✓					M	S, T	M: 800 S: 128	✓	✓		1			M, U	A, S	A, M, R	B, C, I, P, S	P	G, S, U	$10,000-$85,000
NCR Corp. (513) 445-5336	StarSentry Systems Manager 3.6					✓			✓	M	O, S, T, X	M: 25 S: 16		✓	✓	1			M, U	A, S	A, M, R, S	B, C, I, P, Pa, S		S	$5,500-$15,000
Novell, Inc. (800) 638-9273	NetWare Management System 1.1		✓							W	I, T	M: 20 S: 8		✓	✓	1		N	M, U	A, S	A, S		B, C, I, P, Pa, S	G, U	$4,995-$150,000
Nynex Allink Co. (800) 848-8384	Allink Operations Coordinator 2.5			✓		✓			✓	L	O, S, T, X	M: 500 S: 32				2			M, U	A, S	A, R, S	B, C, I, P, S		G, U	$20,000-$500,000
Racal-Datacom, Inc. (800) 722-2555	CMS 6000 3.1					✓				M	S, T	M: 424 S: 32		✓	✓	1			M, U	A, S	A, S	C, I, P	B, I, Pa	G, U	$7,000-$35,000
SunConnect (415) 960-1300	SunNet Manager 2.1					✓				L	D, O, S, T	M: 400 S: 32	✓	✓		1			M, U	S	A, M, R, S	B, C, I, P, Pa	P	U	$3,995
VisiSoft, Inc. (800) 847-4638	VisiNet Enterprise 2.0		✓		✓			✓		W	I, S, T, X	M: 4 S: 2			✓	1		N	M, U	S	A, M, R, S	B, C, I, P, Pa, S	P, S	G (6)	$795-$6,485

Products highlighted by color were selected for The Short List.

FOOTNOTES:
(1) Pricing is based on configuration and usage.
(2) Licensing is done by management workstation.

CMIP = Common Management Information Protocol
DME = Distributed Management Environment
GUI = Graphical user interface
IPX/SPX = Internetwork Packet Exchange/Sequenced Packet Exchange
MIB = Management Information Base
NMS = NetWare Management System
NMVT = Network Management Vector Transport
RMON = Remote Monitoring
SNMP2 = Simple Network Management Protocol Version 2

SOURCE: ERNST & YOUNG, VIENNA, VA.

Continued from page 36

perform many of the functions of a LAN monitor and protocol analyzer. Yet device vendors construct custom extensions to the standard MIBs in order to provide more sophisticated management.

The vast majority of management platforms come with a standard and customized MIB preinstalled.

Some platforms — Cabletron Spectrum, HP OpenView Network Node Manager and SunNet Manager among them — come with a custom MIB compiler that makes it easy for users to load their own custom MIBs. The task would be more difficult without a MIB compiler, and many users looking to add a custom MIB would have to turn to the platform vendor and, usually, pay a fee.

Many of the vendors are currently weighing plans to roll out support for the recently released and more robust SNMP Version 2, saying they will do so when customers demand it.

CMIP support is fairly rare. Aside from those currently supporting the protocol, only a few firms have pledged to offer it, including Cabletron, NCR, Nynex Allink and Racal-Datacom, Inc.

Other management protocols used include IBM's Network Management Vector Transport and X.700, a CCITT standard defining the basic functions that a network managment platform should provide.

APPLICATIONS DEVELOPED

To increase the number of applications that will run on their platforms, many high-end vendors have extensive partnership programs designed to aid third parties in building applications. HP and SunConnect have the most extensive partnership programs, with approximately 100 third-party vendors each. Cabletron, Digital Equipment Corp., IBM and Novell have extensive partnership programs, too.

Some platform vendors have developed a broad range of applications, such as Applied Computing Devices, HP, IBM (for LAN NetView and NetView/6000), Racal-Datacom and VisiSoft.

The Short List

Net mgmt. platforms

The Short List highlights products Network World *recommends for closer scrutiny during the purchasing process for network management platforms. Products on the list were selected based on the breadth of applications and devices they support, and the degree of user customization and configuration options they offer.*

Cabletron Systems, Inc.'s Spectrum 1.1.3. Spectrum supports a wide variety of management applications, the Simple Network Management Protocol and a Management Information Base (MIB) compiler. Custom MIB extensions are also supported. The platform's applications, menus, screens and reports can be easily customized, and functionality can be distributed across multiple workstations.

Hewlett-Packard Co.'s HP OpenView Network Node Manager 3.2. OpenView supports a comprehensive list of more than 100 third-party applications. In addition to SNMP, it supports the Open Systems Interconnection Common Management Information Protocol (CMIP). It runs over a wide variety of network protocols and on more operating systems than any other platform listed in the chart. User customization is supported, and management functionality can be distributed across workstations. OpenView is one of two platforms currently supporting the Open Software Foundation, Inc.'s Distributed Management Environment (DME).

IBM's AIX SystemView NetView/6000 Version 2. While relatively new, NetView/6000 has gained significant support from network device and third-party application vendors. NetView/6000 provides the best ties to IBM's Systems Network Architecture via an LU 6.2 link to IBM's host-based NetView. It supports SNMP, CMIP and DME. It also enables management to be distributed across machines and supports user customization.

Novell, Inc.'s NetWare Management System (NMS) 1.1. NMS supports a wide range of applications and devices on NetWare local-area networks from a DOS-based personal computer. NMS benefits from the large installed base of NetWare LANs. It supports SNMP and many custom MIB extensions, and allows management functionality to be distributed across NetWare servers.

SunConnect's SunNet Manager 2.1. SunNet Manager is the sales leader with more than 7,000 copies shipped. It supports more third-party applications than any other platform listed in the chart and manages a wide range of devices. SunNet Manager only runs on Sun Microsystems, Inc. workstations, but this does not appear to be a major downfall, given Sun's large share of the workstation market. It enables management to be distributed across workstations and provides user customization.

The list of vendors closest to achieving the goal of providing a full-featured, application-rich platform includes Cabletron, HP, Novell and SunConnect, each of which supports a comprehensive list of applications. Others, such as D&G and Hughes, support somewhat fewer.

The relatively new IBM NetView/6000 does not yet have a large number of third-party applications. However, it has received attention from many developers and is expected to support many third-party applications in the years to come.

"SunNet Manager is loosing ground quickly," says Mike Rothman, manager of global network services consulting with META Group, a consulting firm in Reston, Va. "It just doesn't have the same support from third-party application vendors. The primary saving grace for SunNet Manager has been the fact that Cisco — and, until recently, SynOptics — have been slow to port their element management applications to other platforms."

STRIKING AT THE CORE

While the appplications perform bread-and-butter work on a management platform, they rely on the platform's core architectural components to get the job done. Developers can use APIs or development tool kits to build applications that use these core components, such as a database management system, a GUI and an operating environment.

The single most important core component of the management platform is the database — the storehouse for the key data created and used by the management applications, including MIB data, inventories, trouble tickets and configuration files.

The database is typically relational and uses SQL. Some vendors provide their own DBMS, while others provide a third-party one, with Ingres being the most popular among the platform vendors listed in the accompanying chart.

While most proprietary DBMSs provide the ability to produce custom reports, there may be limits on the report-generation tool's flexibility. Some users may simply prefer a database they are already familiar with and choose the management platform on that basis.

Because the management platform stores a tremendous amount of information, the DBMS is frequently regarded as the most critical piece of the network management tool set. To minimize potential network downtime, most of the management platforms allow for a backup server. Information gathered by the primary server is commonly mirrored to the backup. Of the products in the chart, only D&G's LANWatchMan does not support a backup server.

Many management platform vendors are beginning to support object-oriented databases to facilitate application development. Object orientation enables developers to define network components and all associated pertinent information as an object. Once built, this object can be reused in multiple applications. Object-oriented systems also enable developers to define classes of objects that share and inherit characteristics from one another, thus making applications developed for one product more portable to other environments.

Of the 18 products in the chart, 12 support object-oriented application development. Only DEC's Polycenter SNMP Manager 300 1.2, IBM's LAN Network Manager 1.1, and the products by Hughes, MAXM Systems Corp., NCR and SunConnect do not support object-oriented application development.

Most management platforms are moving toward support for standard object-oriented management environments such as the Open Software Foundation, Inc.'s (OSF) Distributed Management Environment (DME) and the Network Management Forum's Open Management Interoperability Point (OMNIPoint).

DME is a set of specifications for defining all network and functional management elements in a single standard fashion. OMNIPoint is a set of specifications that incorporates DME, SNMP, CMIP and Unix International, Inc.'s Atlas in an attempt to create a single comprehensive management environment. Vendors can claim to support OMNIPoint1 by using a subset of the standard, thus creating possible interoperability problems with other platforms that claim to support OMNIPPoint 1.

The second core element of a management platform is the GUI. The GUI's basic job is to provide a color-coded display of management information, multiple windows into different core or element management applications, and an iconic or menu-driven user interface.

"The GUI is important because it enables less technical people to operate an otherwise technical system, and it provides a consolidated, easy-to-understand format for the user," The Methodist Hospital's Baxter says.

By providing a consistent interface between

Continued on page 42

Chicken and egg

Users simultaneously installing a new network management platform and new net devices face a chicken-and-egg decision. Which comes first? Picking a management platform first often forces users to buy the devices it was designed to manage and vice versa. Instead, users should select a management platform and net devices in tandem.

That's what The Riverside Methodist Hospital of Columbus, Ohio, did when it designed a new hospitalwide network.

At first, the hospital wanted to hold off on selecting the management platform until its intelligent hubs and routers were selected. But it quickly found that choosing a net device without considering the management platform was impossible.

The hospital was evaluating devices from Cabletron Systems, Inc., Cisco Systems, Inc., Hughes LAN Systems, Inc., SynOptics Communications, Inc., Ungermann-Bass, Inc. and Wellfleet Communications, Inc. and asked each to recommend the management platform that would best run applications designed to handle their devices.

"The responses were surprising," says Thomas Eckfeld, director of data processing services at Riverside Methodist. "We expected a lot more flexibility. We were shocked at how rigid some of the vendors were."

Cisco required SunConnect's SunNet Manager. Wellfleet recommended Hewlett-Packard Co.'s HP OpenView Network Node Manager — although its management applications could run on a variety of other platforms, including SunNet Manager and IBM's AIX SystemView NetView/6000. SynOptics, at the time, required SunNet Manager. Hughes and Cabletron recommended their own products, Monet Network Manager and Spectrum, respectively.

UB's management application, at the time, did not run under any management platform, which ruled it out. But the company has since ported its NetDirector application to HP's OpenView.

Hughes hubs were also ruled out because they had to be managed by Monet Network Manager, which the hospital believed did not support as many applications for handling other devices as the contending management platforms.

This narrowed the pool of hub vendors to Cabletron and SynOptics, and router vendors to Cisco and Wellfleet. The hospital put together a decision matrix, listing the devices, their management application software and the recommended management platform.

The Methodist Hospital's decision matrix

Device vendor	Device management software	Management platform
Cabletron Systems, Inc.	Remote LANview	SunConnect's SunNet Manager
	Spectrum	Spectrum
Cisco Systems, Inc.	Cisco Works	SunNet Manager
SynOptics Communications, Inc.	Optivity	SunNet Manager
Wellfleet Communications, Inc.	Site Manager	Hewlett-Packard Co.'s HP OpenView Network Node Manager

The Riverside Methodist simultaneously investigated other platforms. "We looked at all of the major market players to see how well they met the full range of our management requirements," Eckfeld says.

The hospital narrowed it down to HP OpenView Network Node Manager and SunNet Manager based on the number of available applications, the devices they could manage and usability. This analysis, together with the decision matrix, led the hospital to select SunNet Manager, which, in turn, drove the decision to choose Cisco routers and SynOptics hubs.

✑ Stuart Aaron, Marvin Chartoff and Bob Reinhold

Continued from page 41

the user and the diverse underlaying management tools, the GUI simplifies what a user needs to learn and provides a standard tool for application developers.

The platform's GUI is an implementation of a standard windowing environment. The most common windowing environment is the OSF's Motif, with 11 management platforms (mostly Unix-based) using it. Not surprisingly, Microsoft Corp.'s Windows is favored by the DOS-oriented platforms. OS/2 Presentation Manager is only used by IBM. HP's OpenLook is the windowing environment used by two firms listed in the chart, although HP itself uses Motif.

Management platform functions and applications

Company	Product	Core management functions/applications											Element management applications								
		A/I	Auto discovery	Backup	DBMS	Help desk	Inventory	License mgmt.	Policy	Statistics	Version control	Other	Cable plant	Intelligent hubs	Operating systems	PC boards	Printers	Protocol analyzers	Routers	Wide-area network	Other
Applied Computing Devices, Inc. (812) 232-6051	Network Knowledge Systems 4.X	✔	✔	✔	✔	✔	✔	✔		✔			✔	✔	◆		✔			✔	
Cabletron Systems, Inc. (603) 332-9400	Spectrum 1.1.3	✔	✔	✔	✔	◆	◆	✔	◆	◆			◆		◆	✔		◆	✔		
Data General Corp. (800) 328-2436	OS/EYE*NODE 1.0		✔	◆	◆		✔	✔		✔	✔						✔			✔	
Digital Equipment Corp. (603) 881-2299	Polycenter SNMP Manager 300 1.2		✔	✔	◆		✔	✔		✔					✔			◆		✔	
	Polycenter Network Manager 200 and 400 1.3		✔	✔	◆	◆	✔	✔		✔		◆			✔		✔	◆		✔	
D&G Infosystems, Inc. (516) 538-1240	LANWatchMan 1.0.0					✔	✔							✔							
Hewlett-Packard Co. (800) 637-7740	HP OpenView Network Node Manager 3.2	◆	✔	✔◆	◆	◆	✔◆	✔		✔◆	✔	✔◆	◆	✔◆	✔		✔◆	✔◆	✔◆	◆	✔◆
Hughes LAN Systems, Inc. (415) 966-7300	Monet Network Manager 5.1		✔	✔	✔					✔				✔							
IBM (800) 342-6672	IBM LAN Network Manager 1.1		✔	✔	✔		✔			✔	✔										
(800) 426-2255	LAN NetView		✔		✔	✔	✔◆			✔	✔		✔◆		✔◆	✔◆	✔	◆	◆	✔	✔
(800) 426-6865	AIX System View NetView/6000 2	◆	✔	✔	◆	✔	✔◆			✔		◆	◆	✔	✔◆			◆			
MAXM Systems Corp. (703) 761-0400	MAXM with MAX/SNMP 2.1.2		✔			✔			✔											✔	
NCR Corp. (513) 445-5336	StarSentry Systems Manager 3.6	✔	✔	✔	◆	◆					✔				✔				✔		
Novell, Inc. (800) 638-9273	NetWare Management System 1.1	✔◆	✔	◆	✔	◆	◆	✔				◆		◆	✔◆	✔◆	◆	◆	✔	◆	
Nynex Allink Co. (800) 848-8384	Allink Operations Coordinator 2.5	◆			◆	✔	✔					✔							✔	✔	
Racal-Datacom, Inc. (800) 722-2555	CMS 6000 3.1		✔	✔	✔	✔				✔	✔	✔			◆		◆	◆	✔	✔	✔
SunConnect (415) 960-1300	SunNet Manager 2.1	◆	✔◆		◆		◆		◆	◆			◆		◆			◆	◆	◆	
VisiSoft, Inc. (800) 847-4638	VisiNet Enterprise 2.0		✔		✔		✔			✔	✔		✔		✔	✔	✔			✔	✔

KEY:
✔ = Application offered by platform vendor.
◆ = Indicates that at least one third party provides the specified application, though more than one might.

SOURCE: ERNST & YOUNG, VIENNA, VA.

MANAGEMENT CUSTOMS

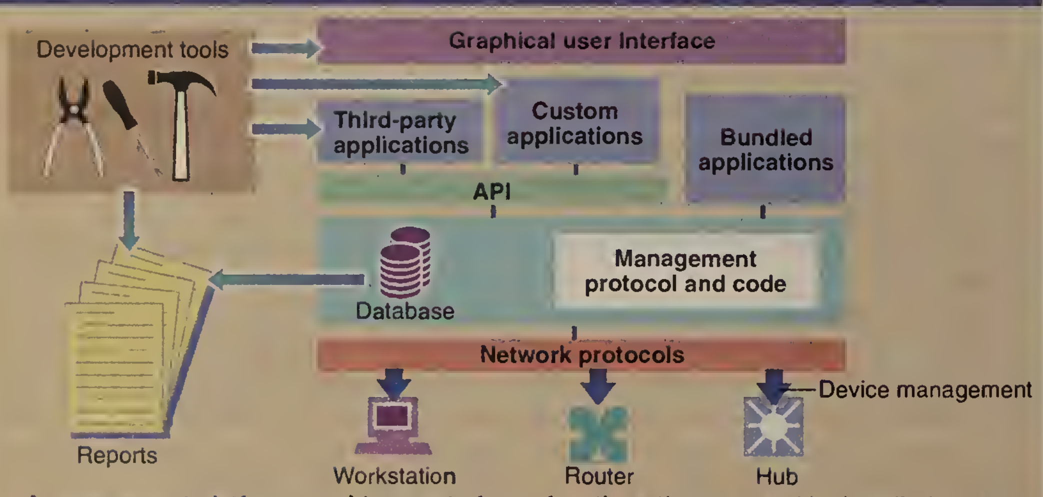
As the foundation on which the majority of an organization's network management tools and applications will run, it is important that the platform is user-friendly and provides built-in or add-on tools, which allow various forms of customization. For example, the GUI should enable users to build custom screens and menus, and the DBMS should enable users to build custom reports and other value-added database applications.

A management platform should simplify, not further complicate, the user's network. Finding a platform that fits the existing environment is a critical step in the selection process. It is important to choose a system that operates in an environment based on hardware, operating systems and network protocols that the organization's personnel is already familiar with or can easily learn.

Products that run on different hardware platforms have a significant advantage over those that do not because they allow the user to implement various levels of solutions for differing applications.

For example, an autonomous and technically sophisticated department might want to manage its own LAN using a management platform that runs under Windows. If that same package also runs on a more powerful platform, such as a Reduced Instruction Set Computing/Unix workstation, it could also be used to handle the rest of the enterprise net. Because both groups use the same management platform, information can easily be shared between them and management responsibility can be effectively distributed.

Management platform features



A management platform provides a set of core functions that are used by bundled, custom and third-party applications to control devices throughout the network.

GRAPHIC BY TERRI MITCHELL

SOURCE: ERNST & YOUNG, VIENNA, VA.

Most management platforms are implemented in a distributed fashion, enabling users at various locations on various subnetworks to access the system (see story, page 36). In these cases, it is a requirement that the management platform support the appropriate network protocols. Most management platforms support a variety of commonly used network protocols, with TCP/IP being the most recommended one due to its close relationship with SNMP.

PRICING

Figuring out management platform pricing is tricky because they are complex systems with many optional modules and features. Customers can select the core applications they want and forgo others. Additionally, many platform vendors will sell the workstation that the management platform will run on, and, in some cases, the platform can be purchased from a device vendor. This makes apples-to-apples comparisons difficult.

Prices listed in the Buyer's Guide chart cover the cost of software only, which includes the core database and GUI, as well as network and management protocol stacks. Low-end products are generally priced up to several thousand dollars. VisiSoft has the lowest starting price of any platform in the chart, beginning at $795 and going up to $6,485 when all options are ordered. The next lowest price is D&G's for its LANWatchMan, which is set at $1,295.

Pricing for high-end management platforms typically starts at several thousand dollars and rises to hundreds of thousands of dollars. SunConnect cites a single price for SunNet Manager: $3,995. Prices for DEC's Polycenter SNMP Manager 300 range from $3,000 to $6,000, while prices for its Polycenter Network Manager 200 and 400 start at $14,700 and spiral up, depending on selected options. HP lists a single price for HP OpenView Network Node Manager: $15,750. The highest starting price is that of Applied Computing Devices — $65,000 for its Network Knowledge Systems 4.X, while the highest overall cost is $500,000 for a fully configured Nynex Allink Operations Coordinator.

However, the management platform plays such a central role in keeping a handle on today's growing nets that many users believe the money spent is a wise investment. The modularity of many platforms allows customers to purchase base systems today and add functions and applications later.

WHAT'S AHEAD

There will be a growing number of applications to choose from in the near future. Developing management environment standards, such as DME and OMNIPoint 1, promise to provide a framework in which applications can do a better job of interoperating with one another, communicating with managed devices and interfacing with the user.

Development activity is under way that will extend the reach of these platforms to manage desktop personal computers and the software running on them via such applications as centralized software distribution. The platforms are also reaching into systems management and before long are expected to be able to manage everything from workstations to minicomputers, allowing remote system backup, processor utilization checks and reconfiguration.

Lastly, today's network operator may have only a single screen to deal with rather than 15. But when an event occurs, the operator still has to pick up the phone and call someone. Efforts to closely integrate management applications with groupware and work flow packages may well provide the ability to automatically launch electronic mail messages when certain conditions occur.

Efforts to develop these new applications prove that the need for good network management is growing in importance. It will likewise become more important for users to make sure that all of these new pieces fit tightly into the network management puzzle.

☛ Aaron is a consultant, Chartoff is a principal and Reinhold is a senior manager at Ernst & Young's National Technology Services Organization. They can be reached at (703) 903-5000.

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Letters

Continued from page 33

This change is not made until the facilities are in place for dedicated services, the account has been established for new customers and the translation for routing has been installed in the new carrier's network. Customers should coordinate this transition with their new carrier's account representative as they would any other service installation. It is also important for customers to cancel service with their old carrier *after* the CIC change has been made and service has been established with their new carrier.

The interim period between RespOrg change and CIC change should be transparent to the customer, but coordination between the carriers is important.

Secondly, the industry guidelines and procedures adopted by the carriers have proven to be so successful and cooperative that the Number Administration Service Center (NASC) has been sparingly used to make RespOrg changes during the first two months of portability. This is significant not only as an indication of carrier coordination, but also as a money saver. The new carrier can save $31 a number, the charge the NASC assesses for making a RespOrg change.

Since Sprint Corp. has already converted over 20,000 numbers to Sprint from other carriers, Sprint has saved $620,000 by working cooperatively with other carriers. While situations like the one described in your article have occurred, our experience has shown these instances to be limited and quickly resolved.

Gerry Euston
Vice president, Business Product Marketing
Sprint Corp.
Kansas City, Mo.

Mid-range overlooked

I enjoyed your article "IBM delivers a key cog in distributed SNA machine" (May 31, page 1). However, I noticed that in the article, as well as in the "Through the years..." graphic, no mention was made of the IBM 5494 control unit. The 5494 and compatibles are indeed Advanced Peer-to-Peer Network (APPN) devices, allowing users access to APPN resources. The 5494 is seen by the Application System/400 as a Low Entry Networking node. The IBM mid-range gave birth to APPN long before VTAM ever dreamed of being a peer to anything. It is a shame that the mid-range is so often overshadowed and overlooked.

Mike Drummer
Senior technology consultant
Perle Systems, Inc.
Westmont, Ill.

Help desk

Continued from page 5

and Volume 47 of the Code of Federal Regulations. Therefore, if the tariff your carrier is imposing is in conflict with a regulation, the tariff is illegal. Complaints regarding tariffs can be filed, either formally or informally, with the Federal Communications Commission. Section 208 of the Communications Act of 1934 mandates that the FCC investigate all complaints regarding common carrier services.

We are experiencing a loss of 4 decibels between a Micom Communications Corp. Marathon 5K multiplexer in Italy that supports voice traffic on an international basis and a Marathon 5K in Brussels that supports domestic voice traffic. This loss is in one direction only, from the international unit to the domestic unit. To compensate for the loss, we have to adjust the levels of our private branch exchange to add a 4-decibel gain. Is there a better way to resolve this problem?

Keith O'Brien, Piscataway, N.J.

Leonard Frey, Micom's manager of product management, replies:

The internal levels between the Marathon 5K's domestic and international voice modules were set to compensate for the different components used in analog interfaces, resulting in a difference of a couple of decibels from end to end. However, these input and output levels can be adjusted to suit the user's external equipment.

The procedure is to use a tone oscillator at 1004 Hz and 0 dBm into the telephone interface. For E&M or key telephone system (KTS) interfaces, place the oscillator at the telephone; for off-premises extension (OPX) interfaces, place the oscillator at the Marathon unit. Set the associated voice interface to Input Level Display and adjust it to 0 dB. Then measure the output level at the far end with a decibel meter.

At an OPX interface, the level should be -2 dBm to -3 dBm. For E&M or KTS interfaces, the output level should be adjusted so that the level received at the telephone or key system is -6 dBm, or the standard level at that location.

I want to connect my company's minicomputer to the Internet. Who provides this service?

Ray Harwood, Tucson, Ariz.

L. Stuart Vance, vice president of engineering for TGV, Inc., a networking software company in Santa Cruz, Calif., replies:

There are two main types of Internet service providers: regional providers and national commercial providers.

The regional providers are often National Science Foundation (NSF)-sponsored networks and provide service coverage over anywhere from a metropolitan area to a 10-state region. Regional networks are often comprised largely of academic and research organizations, and may have significant restrictions on the type of traffic that you can run over them. Most regional networks that limit commercial access follow the acceptable use policies of the NSF Network, the U.S. national research and education backbone network, or of the Federation of American Research Networks, an organization of regional and national Internet providers.

To find the regional provider nearest to you, call the Internet Network Information Center (InterNIC) at (800) 444-4345.

The national commercial providers allow unrestricted access to companies connected to them (and usually to companies on other commercial networks).

The national commercial networks include Alternet, from UUNET Technologies, Inc., (703) 204-8000; ANSNet, from Advanced Network & Services, Inc., (800) 456-8267; PSINet, from Performance International, Inc., (703) 620-6651; and SprintLink, from Sprint Corp., (703) 904-2156.

A third option is to use a public access Unix site, which can provide you with Internet access through its system.

To find a public access site in your area, call the InterNIC.

For additional information on Internet service providers, see NW's *July 19 Buyer's Guide.* ◼

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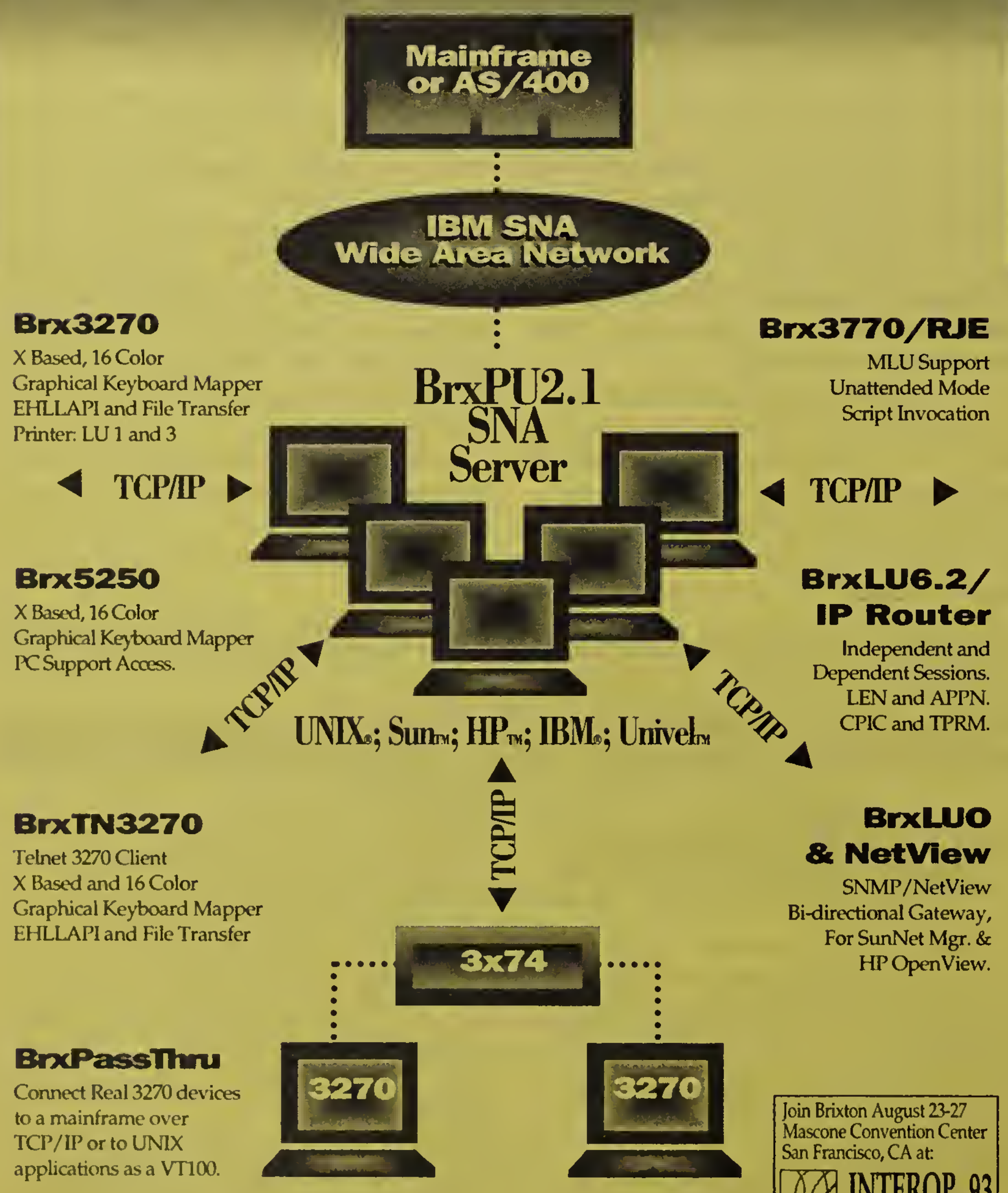

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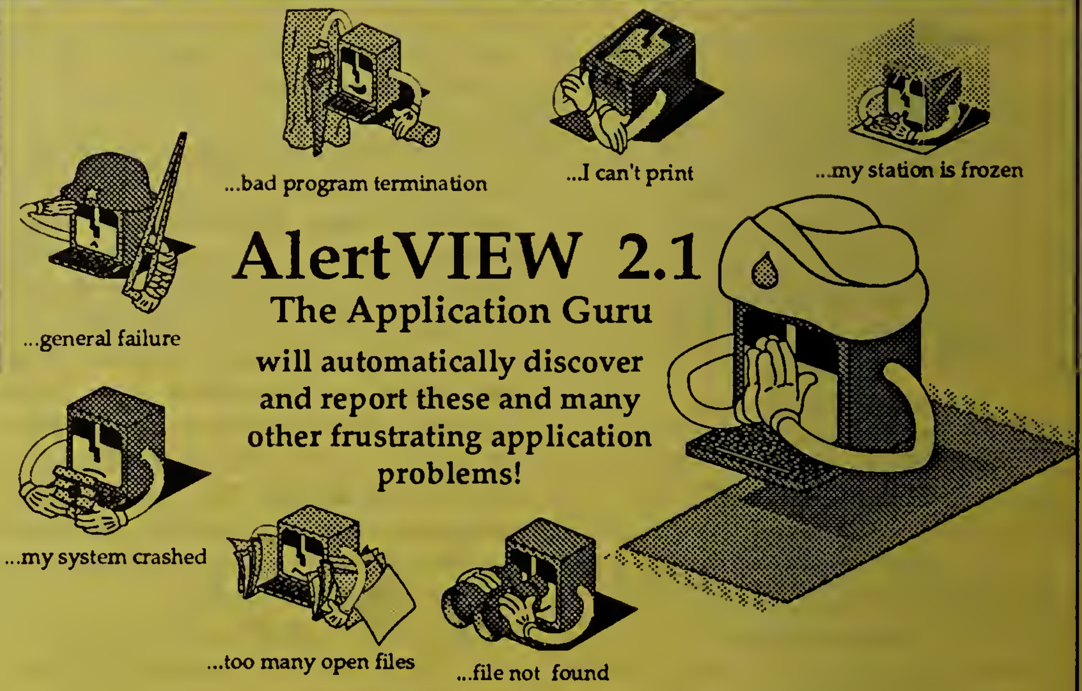

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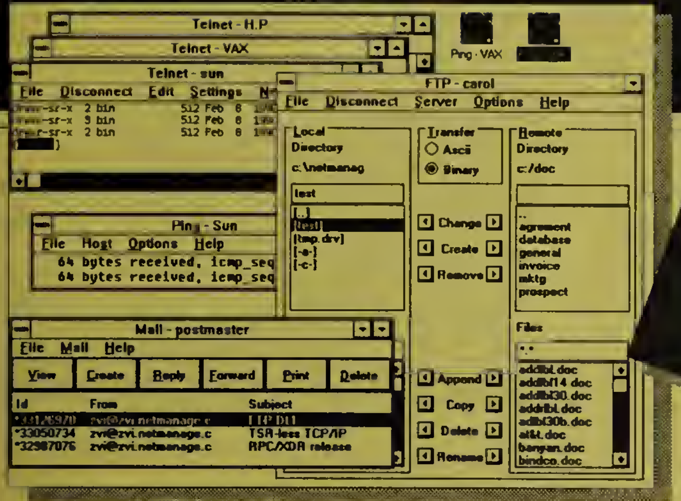

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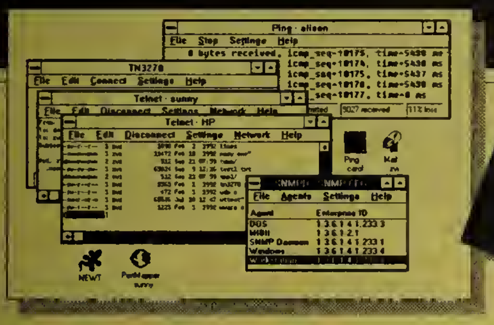

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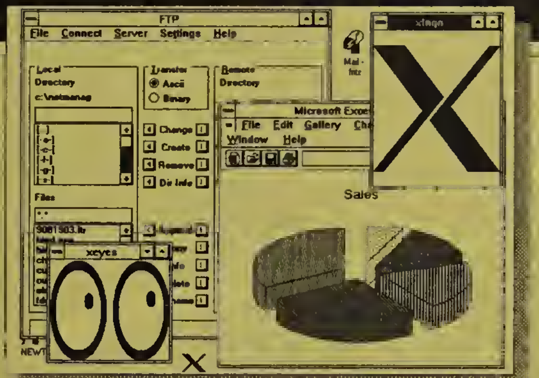

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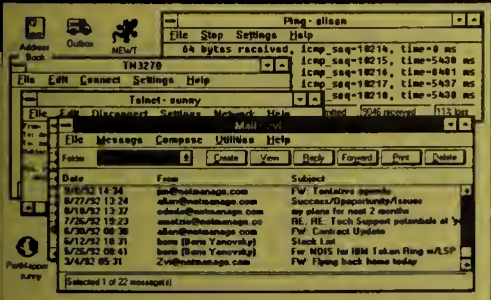

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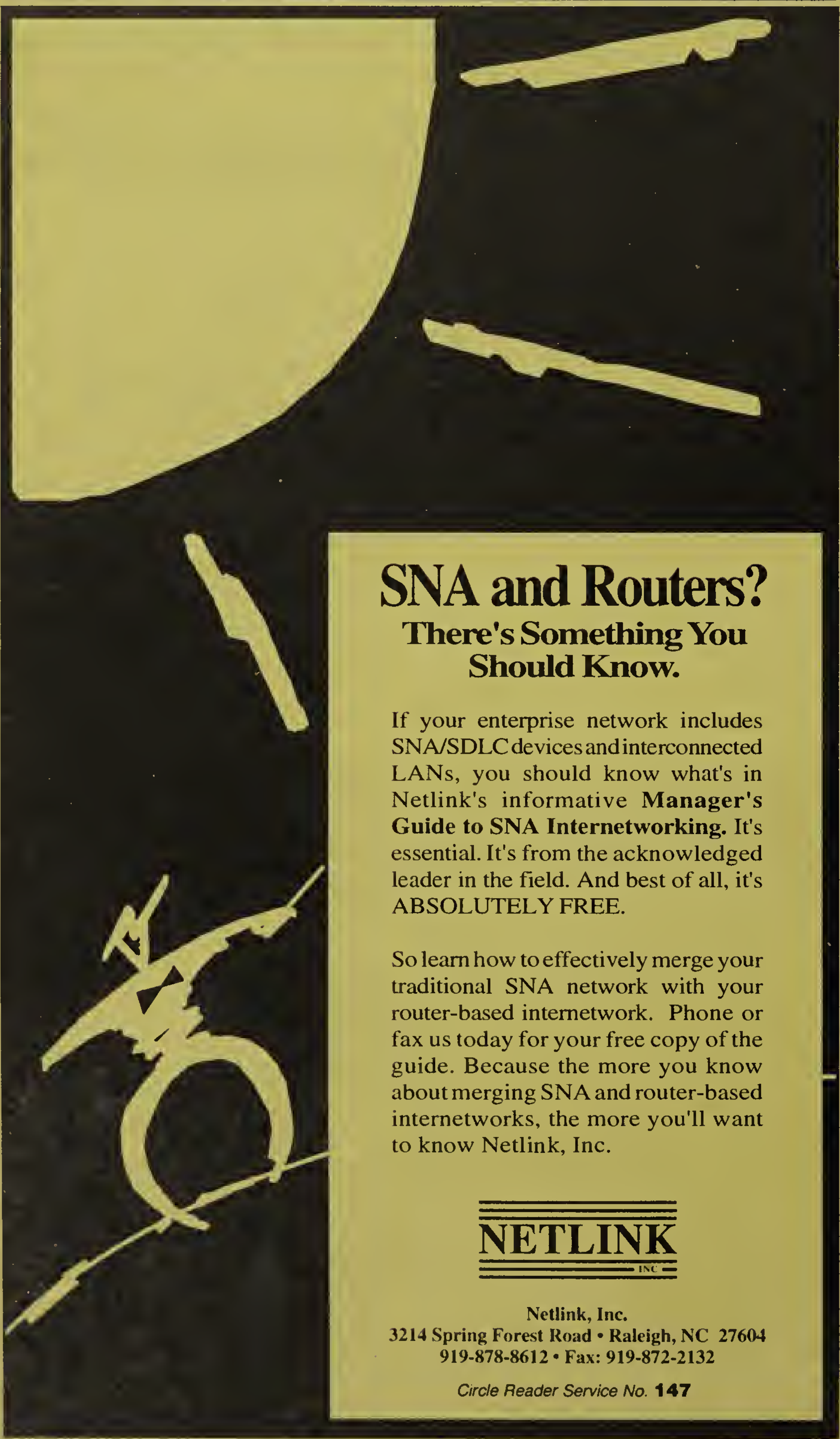
SNA INTERNETWORKING



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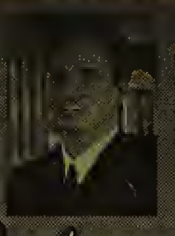

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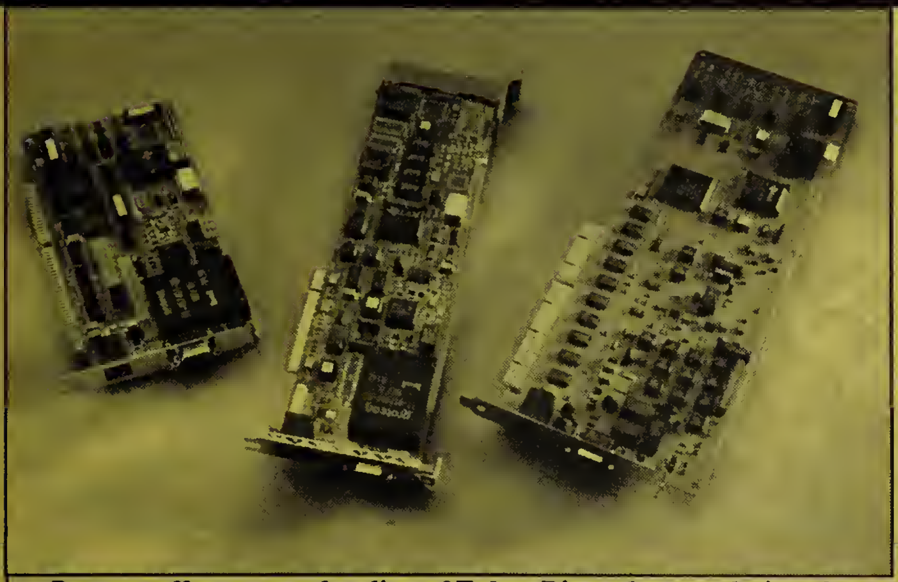

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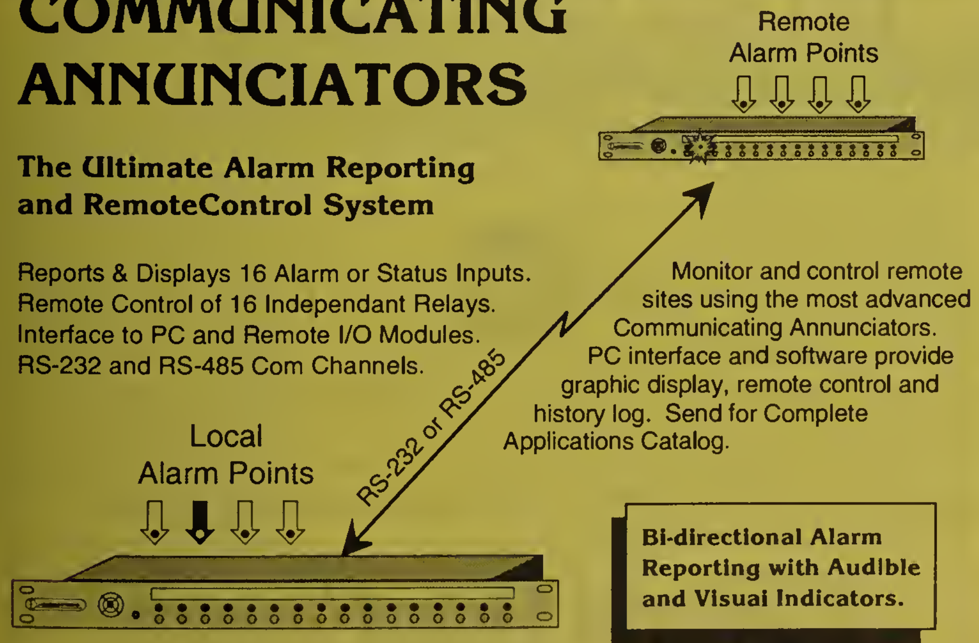

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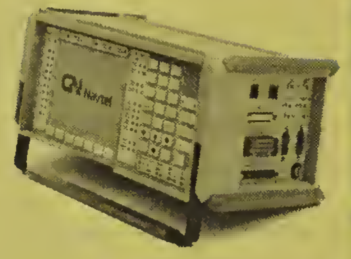

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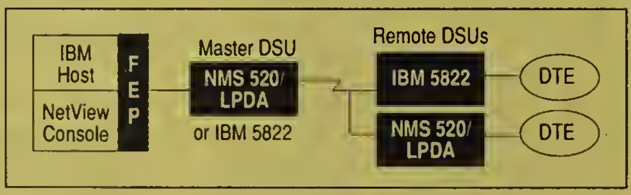

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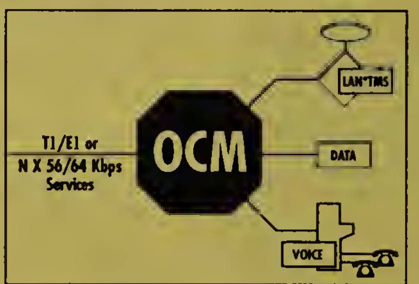

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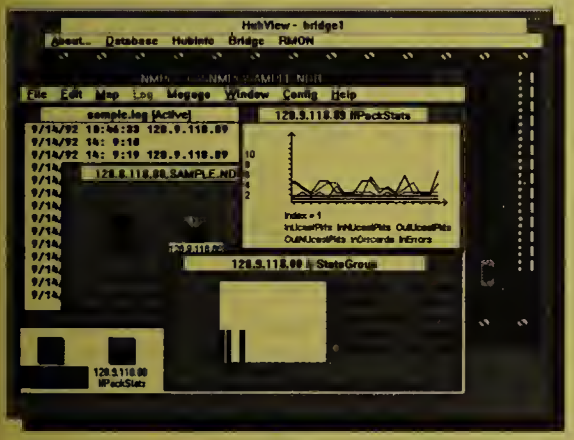

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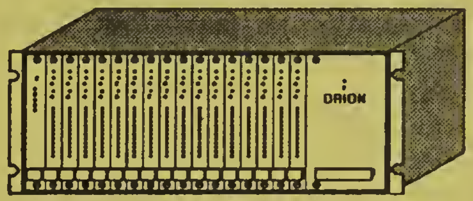

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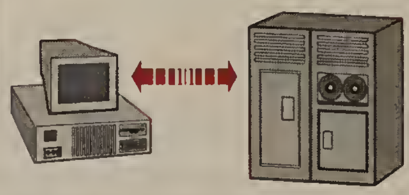

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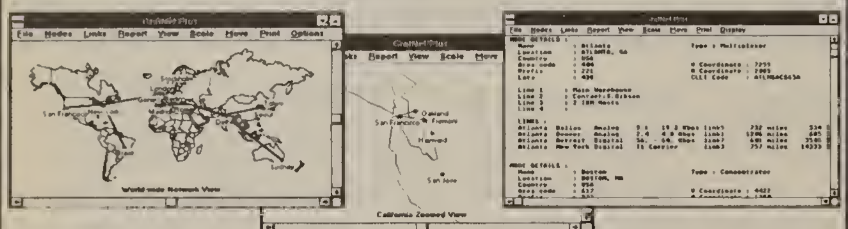

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AppleTalk

Continued from page 1

Despite all the changes it includes, the Enterprise ToolBox will not constitute AppleTalk Phase III, Hornbuckle emphasized, and there will be no change in the packet format. "We're not changing the rules," he said. Users will be able to employ their existing applications, although only new TET-compliant versions of the applications will take advantage of its benefits.

After a seeding program that has alpha release code in the hands of some 5,000 application developers, Apple expects to have "final quality code in developers' hands by the end of [1993]," Hornbuckle said, including support for AppleTalk, Macintosh Transmission Control Protocol and documentation. Novell, Inc. and Digital Equipment Corp. are expected to chip in with stacks for Internetwork Packet Exchange (IPX) and DECnet networks, respectively, he added.

TET software is projected to be in customers' hands by next spring. Distribution options include a separate retail package, licenses to developers for inclusion with applications, or the opportunity to bundle it with the Macintosh operating system.

Apple is also working to deliver protocol independence for remote users. The company intends to eventually replace its AppleTalk Remote Access Protocol (ARAP) with the Point-to-Point Protocol (PPP). Unlike the proprietary ARAP, which is the engine running AppleTalk Remote Access (ARA) scheme, PPP can encapsulate many types of data packets over a single serial link. With PPP, Hornbuckle said, remote users will no longer have to hang up and redial to switch from AppleTalk QuickMail to TCP/IP TelNet connections, for example.

Apple is currently working with Shiva Corp. on a PPP implementation for the Macintosh, although the transition will take a while because ARAP currently has a richer feature set than does PPP.

Although useful, ARAP is an underdocumented proprietary standard, which creates problems when something goes wrong, said John Morency, a principal consultant at Strategic Networks Consulting, Inc., in Rockland, Mass. With its flexibity to support multiple protocols, "PPP is really becoming the standard data link," he added.

PPP is only one of several improvements planned for ARA. Apple's goal is to address the remote access needs of the entire enterprise. To do that, Hornbuckle said, Apple plans to boost the number of clients that can access an ARA server, improve security, provide new user management tools, support wireless connections and use PPP to open up the API's so that ARA servers can support non-Macintosh clients. Macintosh remote client access to other types of servers will be handled by third parties, he added.

But Pieter Hartsook, editor of the Hartsook Report, a Macintosh market research service in Alameda, Calif., warned that Apple's planned steps do not provide the ultimate solution to remote access issues such as security. Ideally, he said, instead of incremental improvements, users want to take advantage of outside security services, such as those provided by AOCE and the Distributed Computing Environment.

Finally, Apple plans to make good on its claim of leadership in wireless connectivity by supporting infrared links for short-range ad hoc uses, freqency hopping spread-spectrum radio for typical local-area network applications, and — when it receives Federal Communications Commission approval — data personal communications service (PCS) radio for high-speed multimedia applications. The company will invest in all three technologies because of trade-offs in range, speed and power requirements. "One size does not fit all," Hornbuckle said.

No matter what the medium, "wireless capability is a nice, natural complement to the ease of use you get on the Macintosh," Morency said. "It helps create the paradigm of the PowerBook as a general purpose productivity tool."

AppleTalk progress report

Apple comes clean on how well it lived up to last year's promises

✓ **Scalability**
First implementation of AppleTalk Update Routing Protocol and formation of AppleTalk Networking Forum to discuss issues.

✓ **Network management**
Strategy coalesced behind SNMP, with versions for AppleTalk and TCP/IP

✓ **Fast data links**
Defined specifications for FDDITalk, developers' kit available for licensing

✓ **Open systems connectivity**
OSI protocols, OSI for the Macintosh, Macintosh ODA, and Macintosh X.400 Version 1.1

✓ **Transport independence**
Macintosh SNMP supports AppleTalk and TCP/IP; Macintosh X.400 support for OSI and TCP/IP; Macintosh OSU support for the X/Open Transport Interface (XTI)

✓ **Wireless**
No deliverables, but busy with R&D as well as government and regulatory activities.

SOURCE: APPLE COMPUTER, INC., CUPERTINO, CALIF.

Vendors join apps development fray

Novell, Inc. was not the only company making network application development news here last week.

In his keynote speech at PC Expo, Microsoft Corp.'s Chairman and Chief Executive Officer Bill Gates announced that his company will integrate its Visual Basic application development tool into various Microsoft Office products.

The intent is to enable users to customize off-the-shelf applications to better suit their needs, by linking information from one application into another over a network.

First on the integration list will be Microsoft Excel 5.0 and Microsoft Project 4.0, both of which are expected to ship this fall. "Our goal is to make custom solution development much easier by using Visual Basic to expand existing applications," Gates said.

Also last week, Borland International, Inc., IBM, Novell, Inc. and WordPerfect Corp. announced support for Apple Computer, Inc.'s OpenDoc technology for Windows. WordPerfect said it will support the specification in its applications, while Novell said it will provide the capability to build OpenDoc applications using its AppWare development environment, which was announced last week. Both WordPerfect and Novell said they would provide product support by the middle of next year, while IBM and Borland did not provide details on product support or dates.

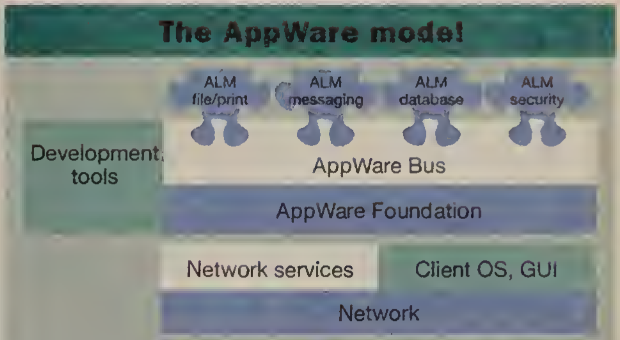
OpenDoc is a software architecture that will let developers write applications that can be partitioned into independent components and then combined in various ways. Users will be able to more easily create compound documents, or documents that include different types of information from different applications.

OpenDoc is expected to enable faster software development since components can be assembled into plug-and-play bundles focused on specific markets.

By Caryn Gillooly

Novell unveils AppWare

Continued from page 1



In Novell's AppWare environment, the AppWare Foundation layer masks the complexity of developing applications across diverse desktops and nets. The AppWare Bus provides a standard means of accessing Application Loadable Modules (ALM), which are reusable software modules.

GRAPHIC BY TERRI MITCHELL SOURCE: NOVELL, INC., PROVO, UTAH

support that will be so important to AppWare's success.

The AppWare architecture has three primary pieces: AppWare Foundation, AppWare Bus and Application Loadable Modules (ALM) (see graphic, this page).

The foundation is essentially an application program interface (API) to which developers using third-generation languages can write to ensure that applications work with diverse operating systems and net services. It is based on technology from STI, which Novell recently acquired.

"Instead of porting your application to Unix, port it to the foundation and it will work with all other platforms," said Joe Firmage, vice president at Novell's Desktop Systems Group and former chairman and chief executive of Serius, also acquired by Novell.

At a higher level, developers working with fourth-generation languages and visual development tools can build applications using ALMs, which are software modules that provide access to various services, such as file and print, and imaging functions. ALMs will be offered by third parties such as Oracle Corp. and by Novell so it will be able to access its own services such as telephony and security.

Oracle plans to provide an ALM that would automate the linkage to an Oracle database.

The bus manages interaction between ALMs and serves as an interface to network services. "The bus lets you plug ALMs together," said Lenley Hensarling, senior technologist at Novell's developer relations group. "It's the motherboard for software."

DONZELLI

ALMs and AppWare Bus are based on technology from Serius.

The AppWare environment will come to life in three Novell products: the AppWare Foundation package, which includes the foundation API; a Construction Kit for ALMS; and a package containing Novell's new Visual AppBuilder, the bus and ALMs for Novell's own services.

Visual AppBuilder is a graphical tool that lets developers build applications by linking ALMs.

The foundation package will be available in October, and the other pieces will be offered in May. Pricing has not been set.

Novell's agreement with HyperDesk will also come into play in their AppWare plan: HyperDesk technology will serve as an object repository, managing objects and providing version control.

TOO GOOD TO BE TRUE?

Users and analysts said that if Novell can deliver on its promises, AppWare would speed development of network applications.

"This could have [a bigger] impact on developing applications than anything we've seen," said Paul Bandrowski, technology manager at Sara Lee Corp. in Chicago. "This could let you create new applications in ways we never thought of before. We're talking about seeing a return of 10-to-1 on development time."

But there are hurdles Novell must overcome before it reaches this development nirvana. "If they can do it, they'll revolutionize the industry, but I don't think they can do it," said Tom Kucharvy, president of Summit Strategics, Inc. in Boston.

For starters, Novell is supplying mainly the plumbing for application development, not a complete set of development tools.

The success of AppWare depends on third-party support, and vendors that offer development tools will have to revamp them to work with AppWare. Analysts said that will take time and could be a problem with some vendors, such as Microsoft Corp., which may balk at retooling its Visual C++.

AppWare also requires a new approach to building applications — one that some developers may be reluctant to embrace.

"From a developer's point of view, you're going to be skeptical when someone says you need to retool the way you work to some other framework that will make the world better because nobody's done that until now," said Eric Pulaski, president of the LAN Support Group, a Houston-based developer of NetWare-based management utilities

There are also concerns about the performance of applications written to an interface layer like AppWare, although Novell dismissed them.

"Applications built using this technology are as fast or faster than under native operating systems," said former STI official Doug Donzelli, who is now vice president of Novell's Desktop Systems Group.

Some heavy hitters such as AT&T, and Oracle voiced support for AppWare. But the companies provided little detail on how their support wili translate into products that fit with the AppWare environment.

Chemical Bank

Continued from page 1

gramming and operating environment, reducing the time required to develop and deliver new products and services, said Michael Papantoniou, vice president of Chemical's Service Delivery Systems.

For example, development time for teller processing, account opening, customer account information maintenance, document preparation and electronic journaling applications will be reduced to one-fifth of what it is now, he said.

The consistency of the branch automation enviroment will also help Chemical usher in object-oriented programming, whereby software code can be reused for new application development.

"We're moving more into an object orientation where we can create a group of utilities to combine to form an application," Papantoniou said. "In the past, most of it has been hard coding."

The new automation systems will include NCR's Unix-based System 3220 teller workstations and System 3350 workstations for customer sales and service representatives. They will be attached by a Transmission Control Protocol/Internet Protocol-based token-ring to NCR System 3345 servers running NetWare/X, an NCR implementation of Novell, Inc.'s NetWare for Unix that is tuned for its processors.

The rings will support an OS/2 Communications Server acting as a gateway between the TCP/IP local-area networks and Chemical's enterprisewide Systems Network Architecture net.

Each branch's LAN will be linked, via 56K bit/sec digital circuits, to a redundant T-1 network that feeds traffic to Chemical data centers located in Wilmington, Del., Somerset, N.J., and Jericho, N.Y.

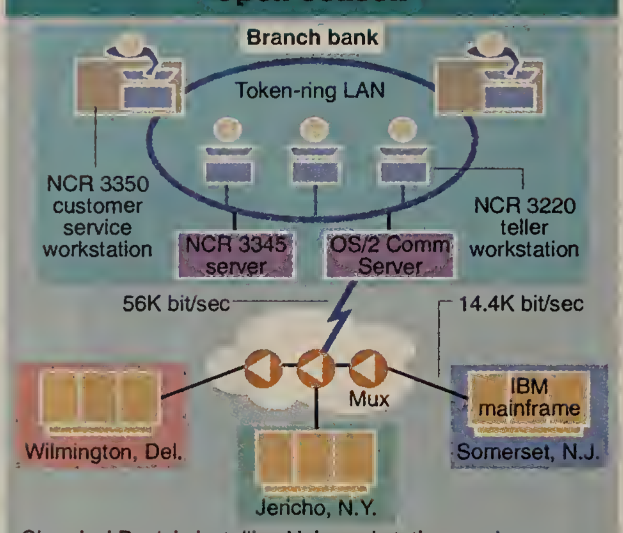
Unlike other client/server projects that involve downsizing mainframe applications to LAN servers, Chemical is adamant about keeping mainframe applications where they are. The benefits of downsizing are not as apparent to Chemical as the risks.

"We have no intent at this point to move any of the core, centralized customer information down to the distributed sites on any large scale," said Nick Messina, a Chemical vice president. "We don't think the technology is there yet."

Messina said Chemical plans to continue to utilize the mainframes as transaction servers, accounting systems and, eventually, database servers for the entire network.

"Our philosophy is to do as much of the processing while the customer is right there in the branch," Messina said. "The idea is to do it once at the point of contact and to keep that information in electronic form all the way through."

Open season



Chemical Bank is installing Unix workstations and servers, and token-ring LANs at 385 branch banks to replace several proprietary terminal-to-host systems inherited from the bank's recent acquisition of competitor Manfacturers Hanover Corp.

SOURCE: CHEMICAL BANK, NEW YORK, NCR CORP., DAYTON, OHIO

AS/400

Continued from page 1

technology to do it, but only time will tell if they can make it workable in the marketplace."

A 100M bit/sec Fiber Distributed Data Interface adapter for the AS/400 was announced in May and is due out in December. Last week, Gary Alpert, IBM senior strategist for AS/400 networking, said frame relay will likewise be delivered this year in a new release of the OS/400 operating system. The speeds supported have not yet been determined.

"Exactly how ATM will emerge remains to be seen, but we are shooting for 1995 as the time it will be practical for the AS/400 to support ATM," Alpert said. "Networks are getting more complex, and bandwidth will become more stressed as new multimedia applications come to market, but we are positioning the AS/400 to extend and incorporate those changes."

IBM will help the AS/400 exploit higher speed nets by adding High Performance Routing (HPR) features to the AS/400's existing Advanced Peer-to-Peer Networking (APPN) support.

"Users will be able to build TCP/IP applications right on top of the AS/400," Alpert said.

HPR will support the ability to dynamically route data around failed nodes and provide a three- to 10-fold performance improvement by streamlining the APPN data processing procedure. It also will provide pacing and flow control for data as it crosses the APPN net.

IBM will also add at least one T-1 interface to the AS/400 by next February. Today, the largest AS/400s support as many as 644K bit/sec Synchronous Data Link Control links.

Those protocol options will increase with support for MPTN, which is IBM software that sits between the data transport and session layers and lets various applications run over any underlying communications protocol. IBM has already implemented MPTN in its OS/2 and MVS platforms under the moniker AnyNet OS/2 and AnyNet/MVS.

"Applications won't have to be changed to support MPTN," Alpert promised.

Users will likely see AnyNet/400 by the middle of next year, according to Alpert. The first protocols the AS/400 development team will address are likely to be Advanced Program-to-Program Communications over Transmission Control Protocol/Internet Protocol and TCP/IP Sockets over Systems Network Architecture.

IBM also has big plans in the server arena. "What we are looking at is building high-powered, specifically configured and packaged AS/400 servers," Alpert said. "For example, we may create specifically packaged LAN servers or SQL database servers."

IBM is also planning to add Reduced Instruction Set Computing technology to the AS/400, which analysts said will improve its performance in a server role. "Focusing the AS/400's power on specific environments is a strong strategy for IBM and should help users," said Ken Sobel-Feldman, president of the Sage Associates consultancy in Stamford, Conn. "By the end of 1994, with these enhancements, the AS/400 will be a much more competitive box on all levels."

Because of its size and power, the AS/400 would be an ideal server for the Apple Macintosh environment, Tipton added. "IBM has talked about making the AS/400 a full Mac server with the ability to support shared folders and all of the other goodies."

Alpert said IBM has scheduled enhanced TCP/IP support and the addition of Distribued Computing Environment technology for next year, which will give the AS/400 support for applications distributed across multivendor platforms.

"We will be integrating TCP/IP right into the AS/400's operating system, so users will no longer have to buy a separate TCP/IP stack or package," Alpert said. "Users will be able to build TCP/IP applications right on top of the AS/400."

Also in the TCP/IP realm, Alpert said, the AS/400 will likely get Simple Network Management Protocol agent support in the next year or so.

IBM also expects to improve file handling and administrative support of NetWare LANs.

"We'll improve the emulation between the NetWare users and our system, plus look at improving the way we pass data back and forth." Alpert said.

✆ IBM: (800) 426-2468.

Progress

Continued from page 9

that comes close is [Uniface Corp.'s] Uniface."

Using Version 7, Johnson Controls is downsizing an order entry application from an IBM 3090 mainframe to Sequent Computer Systems, Inc. Unix servers. The application will support more than 1,000 users using DOS, Windows, ASCII and X Terminal front ends.

Davis said Version 7's most attractive feature is the User Interface Builder, which allows developers to build graphical or character-based screens. It also lets users employ Progress' fourth-generation language to handle computations and more complex transactions."The User Interface Builder generates a lot of redundant code, saving us time," Davis said. "It also allows us to build complex, transactional-based applications without having to drop down to C or other third-generation programming languages."

Johnson & Johnson is using Version 7 to build a data collection system that will consolidate financial information from 164 subsidiaries in 54 countries into an IBM DB2 database at the company's New Jersey data center.

"Progress' portability and ease of use enables us to deploy applications worldwide across a variety of platforms," said Carro Meacham, assistant director of strategic systems at Johnson & Johnson.

Version 7 will be available sometime in the third quarter on Hewlett-Packard Co.'s HP-UX, IBM's AIX, Microsoft Corp.'s Windows, The Santa Cruz Operation, Inc.'s SCO Unix and SunSoft, Inc.'s SunOs operating systems.

An application built using Progress Version 7 can be deployed on multiple platforms with different user interfaces without changing the source code.Version 7 contains drivers, called DataServers, for database management systems from C-ISAM, CT-ISAM, Digital Equipment Corp.'s Rdb/VMS, Hewlett-Packard Co.'s Allbase, Object Design, Inc.'s ObjectStore, Oracle Corp.'s Oracle Server and Sybase, Inc.'s SQL Server. It will support IBM's DB/2 through the Distributed Relational Database Architecture and Microsoft's Open Database Connectivity.

The company has decided to unbundle its development tools from the Progress relational database, which is a full-featured SQL database supporting record-level locking, rollback and roll-forward recovery, and two-phase commit transactional support.

Version 7 of the database supports triggers, which are codes that are executed in response to database actions. For example, triggers might be used to prevent a user from deleting a customer record when there is an outstanding balance on the account.

"You write the code once and attach it to the database instead of writing functionality into each application," said Sitara Girme, technical specialist at Johnson & Johnson.

A developers' version of Progress Version 7 will be available in the third quarter. Pricing will not be announced until it is shipped.

✆ Progress: (617) 280-4000.

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Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

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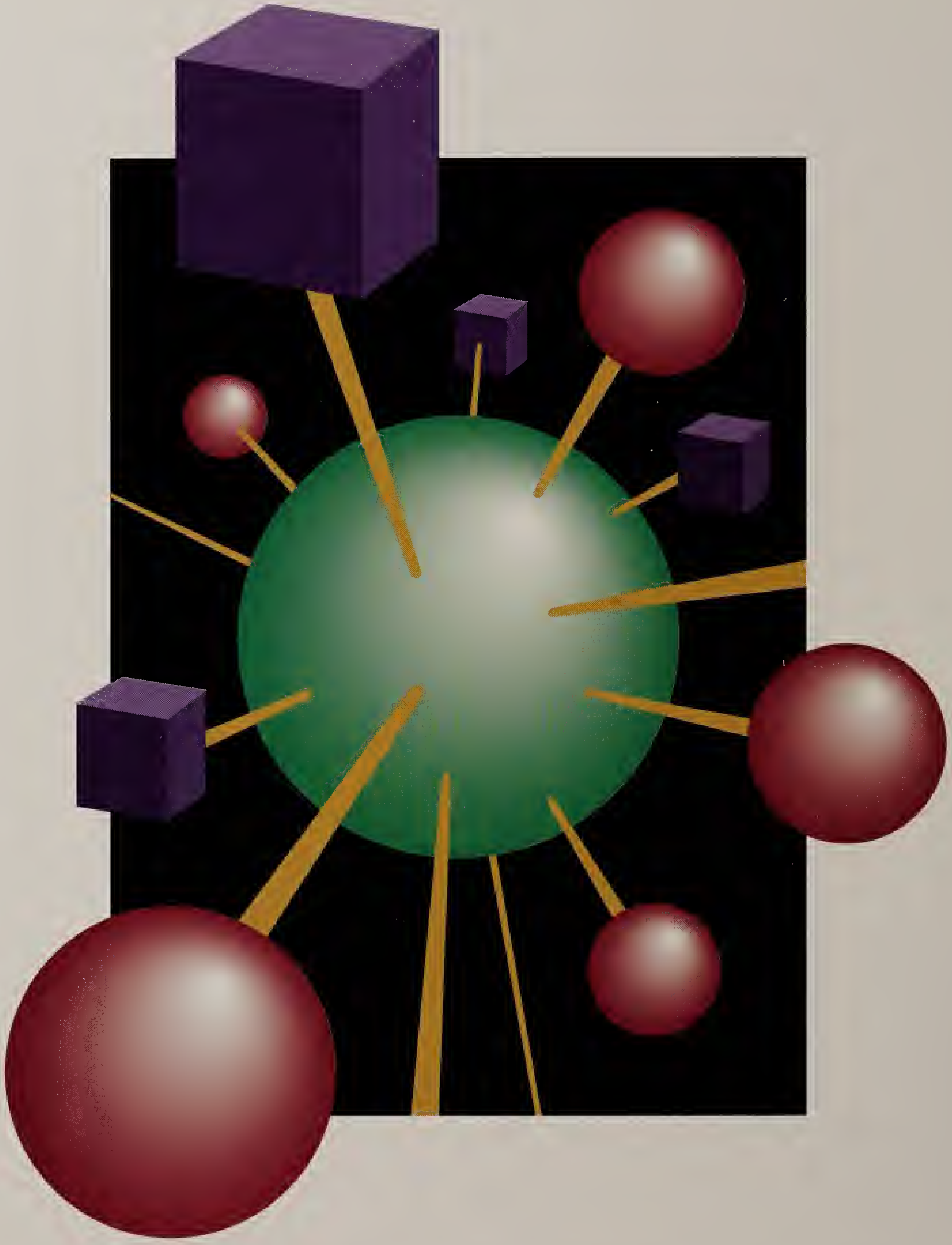

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